



2015 Minerals Yearbook

CEMENT [ADVANCE RELEASE]

CEMENT

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Portland and masonry cement production in the United States, excluding Puerto Rico, increased by 2.3% to 84.4 million metric tons (Mt) in 2015 (table 1), continuing a rising trend since 2009. Output in 2015, however, remained well below the record-high 99.3 Mt in 2005. Overall cement consumption, as measured by sales to domestic final customers, increased by 3.8% to 92.3 Mt (table 9), likewise much lower than the 2005 record-high consumption of 127.9 Mt. The large difference between consumption and production in 2015 reflected, in part, a nearly 37% increase in cement imports (table 1). The average mill net value (“price”) for cement increased by nearly 6% to a record \$106.50 (rounded) per metric ton (t); the previous record was \$104.00 in 2007. The record price, together with the higher sales volumes, resulted in a 9.7% increase in the overall value of cement sales to \$9.8 billion. World production of cement fell by about 2% to 4.1 billion metric tons (Gt) (tables 1, 22).

Percentage or other changes expressed in this report compare activity in 2015 with that of 2014 unless specified otherwise, and except where otherwise indicated, data and trends in this report exclude those in Puerto Rico. Cements covered in this report are limited to the hydraulic varieties broadly classified as portland cement (including blended cements and other varieties listed in table 15) and masonry cement (including portland-lime and plastic cements). A few other types of hydraulic cement (notably aluminous cement) and (or) clinker are included in some of the trade data (tables 16–18, 21) and within the world production data (table 22). Except where the materials are incorporated within finished cement (especially blended varieties of portland cements and some masonry cements), or are used as raw feeds for making clinker, the tables in this report exclude supplementary cementitious materials (SCMs), such as fly ash, other pozzolans, and ground granulated blast furnace slag (GGBFS). Sales data for blended (also called composite) cements listed separately from portland cement are available in the monthly Mineral Industry Surveys reports of the U.S. Geological Survey (USGS). General background information on cement and its manufacture and on the USGS cement canvasses can be found in van Oss (2005).

The current report is largely based on data compiled from USGS annual questionnaires sent to U.S. cement and clinker manufacturing plants and associated distribution facilities and import terminals, including certain terminals that are independent of U.S. cement manufacturers. Notwithstanding very late responses to the 2015 canvass, 130 forms were received of the 135 forms sent, representing 134 out of 139 sites (data for 4 sites were combined with data from other sites) or a response rate of 96%. The data received, however, included all production facilities. Likewise, the 2014 data in this report represent receipt of surveys for 130 of the 134 sites canvassed, including all the production sites. Not all surveys

were fully complete, but the data included 100% reporting of the production tonnages of cement and clinker in both years and, in terms of total tonnages listed in the tables, all but 0.9% of the sales in 2015 and 0.7% of the sales in 2014. Missing data were estimated based on monthly data (which supplied most of the “missing” annual sales data) or past annual reporting; certain breakout data contain a higher component of estimates in 2015 than in 2014. Differences between the years in the number of surveys sent and received reflect a combination of consolidation of reporting by some companies for certain distribution terminals or accounting inventories that previously had been reported separately and, in the case of changes in facility ownership during a year, the need to canvass both owners regarding their respective activities during the changeover year.

For both years, the data exclude a few importers that did not participate in the surveys. To the degree that they were independent of the respondent companies, sales by the missing importers were estimated to be no more than an additional 0.4% of the total portland cement sales in both 2014 and 2015.

Government Programs and Environmental Issues

A large fraction of cement consumption (within concrete) is for public sector construction projects, and cement volumes sold for these projects are thus dependent on various Government funding sources, especially for new construction rather than repairs. State and Federal funding for public sector construction has been significantly constrained in recent years, and remained so in 2015. On December 4, 2015, however, Public Law 114–94, “Fixing America’s Surface Transportation Act” (FAST), was signed into law; the Act authorized expenditures of \$305 billion during the fiscal years 2016–20 for a variety of programs related to U.S. highway and railroad infrastructure. Approximately two-thirds of the authorized spending could potentially involve concrete, but offsetting some of this was a proposed reduction, in FAST, of annual funding for the existing Transportation, Infrastructure and Innovation Act from approximately \$1 billion annually to less than \$300 million per year. In its analysis of the net effects of FAST, the Portland Cement Association estimated that FAST expenditures could boost U.S. consumption of portland cement by an average of about 0.8 million metric tons per year (Mt/yr) (Portland Cement Association, 2015).

Environmental issues related to the cement industry mainly derive from the manufacture of the intermediate product called clinker. Large quantities of raw materials (mainly carbonate rocks, especially limestone) and fuels are burned at high temperatures to make clinker, resulting in large emissions of carbon dioxide (CO₂) and potentially significant emissions (if not scrubbed out) of nitrogen oxides (NO_x), sulfur oxides (SO_x), mercury and some other metals, volatile organic carbon compounds, and particulates. Increasingly, these emissions

are being stringently regulated. The cement industry is one of the leading industrial emitters of CO₂, an important greenhouse gas. For 2015, overall emissions of CO₂ by the U.S. cement industry were calculated to be about 67.0 Mt or 0.88 metric ton (t) of CO₂ per ton of clinker produced. This calculation incorporates the average of two methodologies of estimating the emissions from the combustion of fuels on an individual plant basis: one that uses “standard” heat values for the fuel quantities consumed (table 7), which yields a total of 69.0 Mt, and another, which yields 65.0 Mt, that incorporates heat values reported by the individual plants. For so-called process emissions from calcination of limestone, the emission factor incorporated is that of the Intergovernmental Panel on Climate Change (IPCC) (Hanle and others, 2006). The calculation omits any deductions from calcination for calcium oxide contributed by noncarbonate alternative raw materials such as ferrous slags and coal combustion ashes. Such a deduction would allow a reduction of the calcination-related emissions by about 1.2 Mt in 2015 and 1.1 Mt in 2014, or about 3% in both years, equivalent to removing the total emissions (including from fuels and without adjustments) of 1.5 average-capacity U.S. cement plants for each year. Relative reductions can be significantly larger for the subset of individual plants that actually burn these alternative raw materials. Certain fuels, including alternative or waste fuels, can either directly reduce plant-level CO₂ emissions or may be allowed to be deducted from some reporting protocols for combustion emissions because they are lower in carbon content per unit heat, they are considered to be carbon-neutral (certain biofuels), or credits may be allowed for their use (certain waste fuels). Fuel deductions have not been made in the averages noted above. Apart from substitution of alternative raw materials, plant-level emissions from combustion can be reduced through upgrading to more fuel-efficient kiln line technology. Unit emissions on a finished product basis can also be reduced by use of SCMs and crushed limestone or other fillers in finished cement and in concrete to reduce the clinker content of these products.

The U.S. Environmental Protection Agency (EPA) continued to apply emissions factors similar to those noted above to the USGS published data on clinker production to calculate and formally report GHG emissions associated with the U.S. cement industry. The USGS and EPA calculations, being based on the IPCC methodology for cement, have about a 5% uncertainty. The EPA was comparing its calculations to the results of mandatory GHG reporting by major emitter industries; these data began for the 2010 (emissions) data year and are available for 2010–15 as summary spreadsheets for each year (U.S. Environmental Protection Agency, 2016). For 2015, the cement industry reported to the EPA total CO₂ emissions of 69.0 Mt, the same as the high end of the USGS calculation range and equivalent to 0.91 t of CO₂ per ton of clinker (as applied to the USGS clinker total). The EPA total noted excludes reported but insignificantly small CO₂-equivalent emissions of methane (CH₄) and nitrous oxide (N₂O). All but 12 (14 including Puerto Rico) U.S. cement plants reported having a continuous emissions monitoring system (CEMS) in 2015. For plants lacking a CEMS, the CO₂ emissions were reported separately for calcination and combustion, whereas for plants that had a CEMS, the emissions were reported as grand totals.

Certain other emissions from cement plants have come under regulation in recent years. On September 9, 2015, rules came into effect pertaining to the national emissions standards for hazardous air pollutants (NESHAP); the NESHAP rules were finalized in 2013 and amended in July 2015 (U.S. Environmental Protection Agency, 2015). The NESHAP rules established new, very low limits on individual plant emissions of mercury, total hydrocarbons, particulate matter (as a surrogate for nonvolatile metal pollutants), and hydrochloric acid; the new rules applied to plants that do not burn hazardous wastes. Separate performance standards and emissions limits apply to commercial and industrial waste incinerator units.

Production

Although recovering from a major decline in production and sales in 2007–09, the U.S. cement industry continued to operate at well below capacity in 2015. Following a 7.5% increase in 2014, and in response to more modest growth in cement sales as well as capture of market share by imports, U.S. production of portland cement in 2015 rose by just 2.2% to 82.1 Mt (table 3). Capacity utilization increased proportionately to about 69%. By comparison, during the record production year of 2005, production capacity utilization was 82%, with levels of 85% or higher generally considered to represent plants, or the industry overall, operating at full practical capacity. Production in 2015 increased in most districts, with Missouri, Arkansas and Oklahoma, and northern and southern Texas being notable exceptions; declines in the latter three districts reflected a major decrease in cement sales to the oil and gas drilling industries. Production increases of more than 10% were registered in Arizona and New Mexico, Florida, and Illinois. The 15.4% increase in production in Illinois reflected both strong market growth and the return to cement production midyear of a plant that had been idle since early 2009; work to restart the plant had begun in 2014. Yearend stockpiles of portland cement increased by about 18% to 6.8 Mt. Although incorporated in the calculation of U.S. apparent consumption (table 1), ending stockpiles of portland (and of masonry cement in table 4) are sensitive to several variables, including overall market conditions, possible omission of stocks at terminals, weather-affected yearend sales, and, along with clinker, stock buildups ahead of scheduled kiln shutdowns for routine maintenance scheduled for early in the following year. On a district (assignment) basis, stocks also reflect the inclusion of distribution terminals located in other districts, including some that in fact handle cement from more than one plant. The large cement stocks and increase in stocks in Missouri in 2015, for example, include a multitude of terminals (not necessarily the same for 2014 and 2015) assigned to the Missouri plants but likely not entirely supplied by them, located up and down the entire Mississippi River system transportation corridor.

Cement production capacity (as grinding capacity) data are reported directly by the individual plants and, despite being listed in table 3 (as if just for portland cement), include portland and masonry cements; the capacity utilization percentages listed, however, are with respect to portland cement production only. Capacity changes reported from year to year can reflect a variety of factors, such as shifts in demand for cements of

various degrees of fineness, grinding equipment upgrades, shifts of some grinding capacity to other products (such as GGBFS), new plants and plant upgrades, and plant closures.

Despite continued strong growth in housing construction expenditures, masonry cement production increased by a comparatively modest 4.1% in 2015 to 2.3 Mt (table 4); this followed an 8.0% increase in 2014 and a 9.7% increase in 2013. Production in 2015 remained well below the record-high output of 5.4 Mt in 2005.

With subsidiaries of a common parent company combined under the larger subsidiary's name and with joint ventures' ownership and any plant ownership changes apportioned, the 10 leading cement companies in 2015 were, in descending order of portland cement production, LafargeHolcim Ltd; CEMEX, Inc.; Lehigh Hanson, Inc.; Buzzi Unicem USA, Inc. (including Alamo Cement Co.); Ash Grove Cement Co.; Martin Marietta Materials Inc.; Eagle Materials Inc.; Essroc Cement Corp.; Argos USA Corp.; and St. Marys Cement. The U.S. industry continued to be heavily consolidated, with the 5 leading cement companies, combined, contributing 60% of total U.S. portland cement production and the 10 leading companies accounting for 80%. Of the 10 leading companies, all except Ash Grove, Eagle Materials, and Martin Marietta were foreign owned as of yearend. For the U.S. industry overall, about 79% of total cement capacity in 2015 was foreign owned.

As with cement output, clinker production increased by 2.2% to 76.0 Mt (tables 1, 5); this remained much less than the record-high output of 88.6 Mt in 2006. By comparison to the pre-recession multiyear upward trend leading to the 2006 production record, the output in 2015 in effect was about the same as that in 1999. Only six districts recorded production declines (table 5) but they included the leading three producing States (in descending order, Texas, California, and Missouri). Large increases in production were recorded for many districts; production in Illinois, which increased by 33%, included the boost from the restart of a previously idle plant. A mix of increases and decreases in apparent annual capacity was recorded among districts, most changes being relatively small. The major exception was a 0.9-Mt/yr decrease in northern Texas because of the conversion of a wet plant to semidry (counted as dry) technology in 2014, which included the full capacity of both types of kilns, whereas only the dry kiln was counted in 2015; this conversion was dominant in the overall decrease in U.S. apparent annual capacity by 1 Mt to 104 Mt.

Apparent annual capacity is a statistic sensitive to the survey respondents' apportionment of total downtime on the kilns between that for routine maintenance and that for all other reasons, including (continued) slow sales. Thus, in the absence of new kilns or closure of kilns, small district-level changes in annual capacity likely are of no statistical significance. The total dry plant count increased by 1 and the combination ("Both") technology count fell by 1, owing to the wet-to-dry conversion mentioned, leaving the total plant count unchanged at 93.

Clinker production capacity utilization overall increased to 73% compared with 70.8% in 2014 (again, this statistic is sensitive to the downtime reporting). To some degree, the utilization percentage in 2014 may have been constrained by stockpile drawdowns; yearend stocks in 2015 increased by a

modest 0.3 Mt (tables 1, 5). Although not evident in table 5, many plants continued to report very high counts for total downtime, commonly including seemingly excessive total days for routine maintenance; these data were questioned as to their accuracy and, after consultation with the respondents, corrections were made to remove any extra downtime (generally a result of slow sales) from the routine maintenance statistic. As corrected, the reported subset for average days of routine maintenance did not change by much (up by 1.1 days) for the country overall. At many multikiln plants, reliance continued to be on a single (generally the newest, more energy efficient) kiln for most of the plants' clinker outputs. At a time of relatively modest unit costs for fuels, the continued idle or semi-idle status of many of the older kilns may also reflect other impediments to their restart, such as a lack of employees familiar with the operational quirks of these individual kilns, poor physical condition of the kilns, and the possibility that these kilns, if run extensively, might cause the plants overall to run afoul of the NESHAP limits. To the degree that these factors are valid, the active kiln count and overall plant capacities in table 5 actually may be lower than those listed, and actual capacity utilization percentages thus might be higher than indicated in table 5. In some districts, kiln capacity utilization may have been constrained by increased reliance on cement imports in the local markets.

Table 6 lists the U.S. cement industry's consumption of nonfuel raw materials to make clinker and cement. Cement plants commonly can substitute among a variety of raw materials to make clinker provided that the mix of materials yields the requisite oxide balance to make the key clinker compounds (minerals). For some of the smaller tonnage commodities, seemingly significant changes may reflect activity at just a few plants. For 2014–15, the overall mix of materials appears broadly similar. However, whereas the overall increase in "limestone" and similar materials consumption in 2014 was on trend with the increase in clinker produced, the increase in 2015 for these dominant components (and for the raw materials overall) was—at 0.5% and 1.6%, respectively—significantly less than the 2.2% increase in clinker production. The reason for this apparent discrepancy was unclear; individual plant reporting sometimes is variable as to how moisture content of the materials is handled, and for some plants, use of incorrect weight (mass) units may not always be apparent. In terms of the raw materials added (along with clinker) in the finish mill to make cement, limestone consumption increased by about 5%, roughly double the increase in production of cement overall, but was less than the 22% increase in limestone consumption for cement in 2014. Although some of the increase (in both years) could reflect variation in the recipes for masonry cements (limestone is the main plasticizer used for such cements), it may reflect a general increase in allowed limestone addition into finished "portland" cement, especially in varieties marketed under ASTM standards C1157 and allowed for in the recently (2013) introduced categories of Types IL and IT in the blended cement standard ASTM C595. The 3.1% increase in granulated blast furnace slag consumed was on trend with the 14% increase in sales of blended cement containing this material (table 15); however, the recipes for such blended cements can vary. Consumption of fly ash for cement appears to have declined

by 20%, although sales of blended cements containing fly ash increased by nearly 15%; overall consumption of fly ash for clinker and cement combined fell by 7%. Given that the American Coal Ash Association (ACAA) reported sales in 2015 of fly ash for cement and clinker of nearly 3.3 Mt (American Coal Ash Association, 2016), it is possible that the seeming deficit in table 6 may reflect misreporting of some fly ash as “Other ash;” this category (albeit all for clinker) in table 6 showed an 8% increase in 2015. Despite the 2.2% increase in overall cement production, consumption of gypsum and anhydrite showed no significant change in 2015. This may be partly explained by the increase in masonry cement production and by the 11.5% increase in sales (as a proxy for production) of blended cements (table 15); both cement types require less gypsum than does unblended portland cement. The 2015 data for gypsum consumed include 1.37 Mt of synthetic gypsum, up by 12% but likely underreported because the USGS does not require that natural and synthetic gypsum be differentiated; the 2015 sales of synthetic gypsum reported by the ACAA was 1.50 Mt, up by about 15%. Regarding the USGS data, it is possible that the industry has been inconsistent in accounting for the moisture content of the synthetic gypsum.

Fuel consumption by the U.S. cement industry is shown in table 7. As with nonfuel raw materials, data shifts can reflect activities at just a few plants. Major increases were evident in the consumption of natural gas; continued low unit prices for this fuel has led to some plants adopting natural gas as a major “running” fuel instead of using it primarily for the warmup stage of kiln restarts. Significant increases also were seen in the consumption of fuel oils and liquid wastes (some of which are waste oils). In contrast, coal consumption declined significantly; at some plants, much of the coal consumption has been replaced by natural gas.

Although not revealed in table 7, overall unit heat consumption (gross heat basis) in 2015 was about 4.0 billion joules per metric ton (GJ/t) of clinker, unchanged from that in 2014. Wet kiln plants averaged 6.9 GJ/t of clinker, down by about 3%. Dry kilns (responsible for nearly 97% of total clinker production) averaged about 3.9 GJ/t of clinker, unchanged from that in 2014. Although most plants that have switched to natural gas as a major running fuel have reported significantly higher overall plant unit heat consumptions, this running fuel use is still relatively uncommon and appears not to have boosted the overall U.S. unit heat averages. Overall, coal continued to supply the largest share of total heat consumed (55%, down from 59%), followed by petroleum coke (18%, unchanged), waste fuels (about 15%, down from 16%), and natural gas (12%, up from 7%).

Electricity consumption in 2015 is shown in table 8. Unit consumption increased modestly for the remaining operational wet plants but decreased somewhat for dry plants and for the industry overall. A variety of operational factors affect the unit consumption, and it is unclear if the changes shown in 2015 are significant.

Industry Structure Changes

The merger between the major international companies Holcim and Lafarge to form LafargeHolcim, first announced

in April 2014, was finalized in July 2015 after receiving all necessary approvals. In the European Union, approval was obtained in mid-December 2014, but in Canada and in the United States, approval was obtained in early May 2015, and the merger was finalized in July 2015. The merger created, by far, the largest cement company in North America. As expected, the merger required the disposal (also in July 2015) of some of the companies’ plants and distribution terminals in Canada and the United States (and many plants elsewhere in the world). Lafarge had been the larger producer in Canada and kept its assets there, but all of Holcim’s plants and terminals in Canada were sold to CRH plc, based in Ireland. Because of earlier disposals (2011 and 2012) of Lafarge’s plants in Alabama, Georgia, Missouri, Oklahoma, and South Carolina, no remaining direct State-level production capacity overlaps between Lafarge and Holcim existed except in Iowa, where Holcim had an old plant on indefinite (likely permanent) idle status and where Lafarge operated a modern precalciner plant. Holcim’s small Trident plant in Montana was also sold to CRH because this plant was an occasional cement exporter to Canada, and Holcim also sold three terminals in Illinois and Michigan to Buzzi Unicem. Lafarge sold its Davenport, IA, plant and several terminals along the Mississippi River system to Summit Materials LLC, the parent company for Continental Cement LLC, which operated a plant in Hannibal, MO.

In addition to cement, Lafarge and Holcim were major producers of GGBFS and significant U.S. market overlap for this commodity would have resulted from the merger. Because of this, Holcim’s Skyway (Chicago, IL) slag-grinding plant was sold to Eagle Materials, with the facility being renamed Skyway Cement Co. LLC. Essroc purchased Holcim’s Camden, NJ, slag plant. Instead of being sold, Holcim’s slag-grinding plant at Fairfield, AL, was closed in late 2015 following the exhaustion of its stocks of slag granules; the plant’s supply of fresh granules had been cut off with the midyear 2015 permanent closure of U.S. Steel’s Fairfield blast furnace.

In early 2014, Martin Marietta purchased Texas Industries, Inc., which operated two plants in Texas and the Crestmore and Oro Grande plants in California. At the end of September 2015, CalPortland Co. purchased the Oro Grande, CA, plant from Martin Marietta but chose not to purchase the Crestmore plant. Crestmore had been operating as a grinding facility for some of Oro Grande’s excess clinker and as a cement bagging facility, but with its supply of clinker now cut off, the Crestmore plant was closed toward yearend. This was the only cement plant closure during the year. No new plants opened in 2015, but St. Marys restarted clinker production (April) and cement production (June) at its plant at Dixon, IL; the plant had been idle since early 2009.

In late July 2015, HeidelbergCement AG (Germany) announced that it would purchase Italcementi SpA (Italy), subject to competition authorities’ approvals. In the United States, HeidelbergCement operated as Lehigh and Italcementi operated as Essroc. Approval of the merger in the United States was expected in 2016. Between these companies, production overlap in the United States existed in Indiana, where Essroc had two plants and Lehigh one; in eastern Pennsylvania, where Lehigh had two plants and Essroc operated a complex of one integrated plant and a grinding plant; and in the Washington, DC, market

region, where Essroc operated a plant in West Virginia and Lehigh a plant in Maryland. It was anticipated that one or the other of the companies would likely be required to sell a plant in Indiana and one in either West Virginia or Maryland; sufficient other companies operated plants in eastern Pennsylvania to likely obviate a plant disposal in that State.

A number of plant upgrades were underway during the year. In terms of new kilns or technology (wet to dry) changes, none was reported as completed in 2015, but several were expected to be completed in 2016. The upgrade of the LafargeHolcim (formerly Holcim) plant at Ada, OK, from wet to dry (semidry) technology was expected to be completed late in 2016. The upgrade of the same company's Hagerstown, MD, plant from long dry to preheater-precalciner technology was expected to be completed in mid-2016. At the Ravena, NY, plant (formerly Lafarge), the company was required to shut down its two wet kilns by the end of June 2016 for environmental reasons. A preheater-precalciner kiln was being constructed to replace the wet kilns but was not expected to be online until late 2016; accordingly, the company was importing clinker to provide a stockpile for the mill to continue to make cement during the interim. Buzzi Unicem was nearing completion on a project to replace the three, small, long dry kilns at the company's Maryneal, TX, plant with a preheater-precalciner kiln. The work was expected to be completed in the first half of 2016. Approval was being sought for St. Marys to expand the clinker capacity (by about 0.6 Mt/yr) of its Charlevoix, MI, plant; this was expected to be complete in early 2018.

Consumption

Cement consumption data are in terms of sales to final domestic customers and are derived from both the USGS annual canvass (tables 1, 11, 12, and 14) and monthly surveys (table 9). Although the overall national totals are in close agreement among these tables, only table 9 regional breakout tonnages represent State-level consumption. In contrast, the regional breakouts in tables 11, 12, and 14 pertain to the locations of the reporting entities (chiefly the production sites), not the locations of consumption; it is very common for shipments to cross State lines. In both datasets, the sales include domestically produced cement (made from domestic and imported clinker) as well as imported cement.

Total portland cement sales to final customers increased by 3.8% in 2015 to 90.0 Mt (table 9); monthly data showed increases in all months except for May and October. Overall sales in January were up by more than 12% and represented mild-weather catch-up work; other than a 12% increase in November, increases in the other months generally were less than 5%. In terms of individual States, only 15, and Puerto Rico, showed decreases in sales, and most of the larger declines were related to reduced oil and gas well drilling in North Dakota, Oklahoma, and (especially northern) Texas. As in 2014, the leading consuming States in 2015 were, in descending order, Texas, California, Florida, Ohio, and Illinois; these accounted, in both years, for 40% of the country's total portland cement consumption. Based on the increase in imports (tables 1, 19, 20) significantly exceeding the increase in domestic cement production, it was evident that much of the cement consumption growth was supplied by imports. Per capita consumption in 2015 rose by about 8 kilograms (kg) to 280 kg, still much lower than the record 413 kg in 2005.

Masonry cement sales were somewhat erratic month-to-month but increased overall by 2.4% (relative to revised 2014 data) for the year to 2.30 Mt, still 58% lower than the record-high consumption in 2005.

As noted earlier, a few importers did not participate in the USGS annual cement canvass and their sales to final customers are missing from the data in this report. An estimate of the missing sales volumes would include essentially all the gray cement imports into the Philadelphia customs district and some of the white and specialty cement imports into various districts. Overall, it was estimated that the missing sales continued to represent only about 0.3 Mt (0.3%) of total sales in both 2014 and 2015. However, the sales data in this report did capture a significant tonnage of imported cement that was absent from the official trade data (see "Foreign Trade" section).

Table 10 shows domestic plant loadouts to terminals and sales of portland cement from plants and terminals by mode of transportation. Data in this table are rounded in line with significant uncertainties in the reported tonnages (particularly for loadouts from plants to terminals). The data are broadly similar for both years and show the dominance of truck transportation, and of bulk cement, for sales to final customers.

Cement consumption tonnage can be correlated broadly with construction spending levels, although the comparison is constrained by a number of factors, such as spending applied to repairs rather than to new construction, lags in time between the onset or cutoff of construction spending and the actual consumption of cement (within concrete), and because some types of construction require proportionately more concrete (are more cement intensive) than others.

The Portland Cement Association converts U.S. Census Bureau data on construction spending from current dollars to 2009 constant dollars, believing that the constant dollar data provide a more reliable basis for cement consumption analysis. In terms of 2009 constant dollars, overall construction spending increased by 8.6% in 2015 to \$977.8 billion (Portland Cement Association, 2018). This relative increase, more than double that of the 3.8% increase in total cement consumption tonnages (table 9), likely reflected, at least in part, higher unit prices for cement (see "Prices" section below). The total cement "intensity" in 2015 was about 94 t of cement consumed per \$1 million of construction spending, down by 4.5%. Of the total construction spending, the largest sector was residential construction, which accounted for \$365.6 billion, up by 11.3%; within this, new construction totaled \$237.0 billion, up by 13.5%. The major component of this was single family housing, which is masonry cement intensive and brick and block intensive, totaling \$191.5 billion, up by 11.4%. Multifamily housing, which is concrete intensive, totaled \$45.5 billion, up by 23.3%. Nonresidential building construction, also concrete intensive, totaled \$231.0 billion, up by 17.3%. Public-sector construction totaled \$218.1 billion, up by 4.0%; this was the first increase in this sector's spending in several years. Within the public construction sector, buildings accounted for \$92.7 billion, up by 4.9%, and road (and bridge) construction accounted for \$78.7 billion, up by 5.3%. Sewage and waste disposal construction totaled \$21.1 billion, up by 4.8%, but water supply construction fell by 2.1% to \$11.4 billion.

Table 14 breaks out regional sales of portland cement by type of customer. As listed, ready-mixed concrete producers accounted for 73% of total shipments, but the true percentage to this type of customer was larger (probably close to 80%) because some sales were instead registered to other customer categories, especially airport and road paving contractors, that also use ready-mixed concrete. The ready-mixed customer category (as listed) increased by 6.1%, and the combination of sales to ready-mixed concrete plus airport and road paving contractors also increased by 6.1%. Sales to concrete product manufacturers increased by 11.5%; within this, sales to brick and block makers were up by 21.6%, sales to precast and prestressed slab makers were up by 5.5%, and those to pipe manufacturers were up by 8.3%. These increases may be somewhat understated because some such sales might have been reported under the subcategory “other or unspecified,” which fell by 1.2%. Sales to building materials dealers increased by 6.9%.

Sales to contractors increased by 5.8%, including a 15.5% increase to airport paving contractors, a 4.7% increase in sales to road-paving companies, and a 6.4% increase in sales to soil cement contractors. These gains could be understated given that the “Other or unspecified” contractors category sales increased by 7.8%, but are broadly in line with the construction (especially in the public sector) noted above.

Reported sales to the smaller categories of customers likely are underrepresented because some respondents provide breakouts only into broad groupings of their customers. As listed in table 14, sales into the mining sector increased by 73% but represent only a few respondents. Sales of cement for oil (and gas) well drilling plummeted by nearly 47%, in synch with the 47.5% drop in the average weekly drill count for the year (Baker Hughes Inc., 2016) resulting from low crude oil and natural gas prices. Reported sales of cement for waste stabilization fell by nearly 81% but were likely underreported; the decline contrasted with the increase in sewage and waste disposal spending noted above.

Table 15 breaks out the sales of portland cement by the subset type. Sales continued to be dominated by Types I and II cements (undifferentiated in the data) and by sulfate-resistant varieties of cement (Type V and Type II/V hybrids reported as Type V); these also included equivalent cements sold under the specifications of ASTM C1157. Assignment between “General use and moderate heat” cements and “Sulfate resisting” categories is somewhat artificial because some hybrid cements are listed as meeting the standards for both Type II (or I/II) and Type V (such as II/V) cements; these are intended to be included under the more restrictive category “Sulfate resisting” cements but may not always be so reported. As listed, “Type V” sales increased by 10.9%, largely reflecting generally higher sales into the western States. Sales of oil well cements (including non-API varieties) fell by 41.8%, in line with the decreased number of active drill rigs, as noted earlier. Sales of blended cements overall increased by 11.5%. Sales of blended cement with GGBFS increased by 14.3%, significantly higher than the 3.1% increase in consumption of granulated slag for cement (table 6) and possibly indicating a reduced slag content in the blends sold. Fly ash blended cement sales increased by 14.9%, but this contrasted with the 20% decline in consumption of fly ash

for cement (table 6). The reason for the apparent discrepancy is unclear and is seemingly too large to be explained by a reduction in the fly ash content of the blends.

Prices

Data on cement prices (as mill net values) are given for the United States overall in table 13 and this table also provides a breakout between white and gray portland cement. Tables 11 and 12 provide price data by district for portland cement (gray and white combined) and masonry cement, respectively. Tables 11 and 12 also provide sales tonnages, but they are based on the location of manufacture (or importation) and not the location of consumption. As noted earlier, table 9 is a better indication of individual State-level consumption tonnages. Mill net values are ex-factory average values for all varieties of cement sold and include bagging and palletizing charges for cements sold in bags or packages. Most portland cement is sold in bulk (table 10), but most masonry cement is sold in bags or packages. Except for independently reporting terminals (which report on a “terminal net” basis), the valuations exclude charges for transportation to terminals from where, in fact, much of the cement was sold. Accordingly, mill net values are better viewed as price indexes rather than “shopping prices” for cement. They serve mainly to show general regional variations and trends over time, and small unit price differences are of little statistical significance. Unlike sales tonnages, price data include a significant component of estimates in some districts and this component was higher in 2015 than in recent years.

For the country overall, the average price (including the districts that contain estimates) for portland cement increased by 5.5% to \$105.00 per metric ton (table 13); the increase for gray portland cement was 6.1% to \$104.50 per metric ton, which was \$2.50 per metric ton higher than the previous record set in 2007. The average price for masonry cement increased by \$6.00 to a new record of \$151.50 per metric ton, but the average is sensitive to even small shifts in the proportion of bulk sales; as noted above, most masonry cement is sold in bag or packaged form. Unit values for portland cement increased in all but four districts (table 11).

Foreign Trade

Export data from the U.S. Census Bureau are provided in table 16, and import data are in tables 17–21. Exports have only been a small fraction of the U.S. cement industry’s sales in recent decades, but did increase modestly (in total tons) during the recent recession, and reached a record 1.75 Mt in 2012. Exports have declined since then largely because of increasing domestic cement sales. Exports fell by 8.3% in 2015 to 1.3 Mt; the component of exports to final customers fell by 7.7% to slightly less than 1 Mt (table 9). The main destination of United States cement exports continued to be Canada, which took 73% of the totals in 2014 and 2015 (table 16).

Total imports of cement and clinker increased by 36.3% to 11.3 Mt (tables 1, 17), but the data are incomplete, as discussed below. As listed, the total in 2015 remained well below the record (also incomplete) of 35.6 Mt in 2006. Nevertheless, imports in 2015 supplied much of the growth in cement sales

noted earlier. Imports of gray portland cement accounted for 79% of the total imports (table 19) and were up by nearly 2.6 Mt. The leading import sources of cement and clinker in 2015 were, in decreasing order of tonnage, Canada, China, Greece, the Republic of Korea, Sweden, Turkey, Taiwan, Mexico, Spain, and Egypt; Mexico would be ranked fifth if informal entries of cement were included (see below).

Data for cement imports from Mexico were incomplete for both years, and all or most of the deficit related to gray portland cement entering the El Paso, TX, customs district (table 18); most of what is shown for this district in table 18 is white cement. The missing cement, estimated at about 0.2 Mt in both 2014 and 2015, was material coming in by truck where each truckload had a customs value of less than \$2,500; such shipments are labeled “informal entries” by the U.S. Customs Service and the data on these entries are not sent to the U.S. Census Bureau under the cement tariff code. However, because the importer was a respondent to the USGS cement canvasses, the missing imports are included in the sales data in this report (for example, tables 9, 11). It was unclear if any imports of cement from Canada were being similarly omitted from the import data.

White cement imports are listed in table 20. Based on unexpectedly low unit values, the data for white cement in many past years appeared to have included some gray cement or clinker; the apparent errors likely were because of the use of the wrong tariff code by importers. Although none of the white cement entries for 2014 appear to be misidentified gray cement or clinker, the 2015 entries for Malta and Gozo (likely actually from Turkey) and from Sweden have unit values that appear to be too low to be white cement. As listed, white cement imports increased by 23% to 1.12 Mt, or 1.06 Mt, up by 17%, if debited for the likely misidentified gray cement. As has been the case for many years, the white cement imports in 2015 significantly exceeded the white portland cement sales in table 15, and the apparent discrepancy increases if consideration is also given to the component of domestically produced white cement in the white cement sales. Part of the discrepancy is explained by the fact that white cement can be used as the base for colored portland cement (perhaps reported as gray portland) and to lighten the color of some gray portland cement, as well as for making white or colored masonry cement (not included in table 15). Some sales of so-called domestically produced white portland cement are blends of domestic and imported material. Finally, white cement is a significant fraction of the cement brought in (and sold) by some of the importers that do not report to the USGS.

Apparent imports of clinker increased by nearly 31% to 0.942 Mt (table 21), but the 2015 data included material from Italy into the Philadelphia customs district that was likely granulated blast furnace slag granules misreported as clinker by the importer. If this material is excluded, total clinker imports were 0.878 Mt, up by about 22%. Much of the increase was accounted for by material from Greece and Turkey into the New York City customs district; this material was being stockpiled ahead of the statutory closure, in June 2016, of the wet kilns at a plant in New York. The wet kilns were to be replaced by a precalciner dry kiln, but the new kiln’s completion was anticipated to be several months after the closure of the wet kilns. Apparent imports of clinker from Canada increased by

16% to 0.7 Mt. The data for Canada are underreported because of sub-\$2,500 truckloads that, as with cement from Mexico noted previously, were being registered as “informal entries.” The deficits were estimated at less than 0.1 Mt in 2014 and nearly 0.2 Mt in 2015. The clinker imports from France were material into the Norfolk, VA, customs district for the manufacture of aluminous cement; in most years, the plant also imports aluminous cement from France, and all the 2015 imports from France (table 18) were aluminous cement rather than clinker.

For cement and clinker combined, the 10 busiest customs districts of entry in 2015 were, in descending order of tonnage, Houston-Galveston, TX; Seattle, WA; Detroit, MI; New York City, NY; Cleveland, OH; Columbia-Snake, OR and WA; Buffalo, NY; San Francisco, CA; Miami, FL; and Honolulu, HI (table 18). These leading districts accounted for about 80% of the total imports for the year.

World Review

Production of hydraulic cement, by country, is listed in table 22. For most countries, the data include all forms of hydraulic cement; however, the data for the United States are for portland and masonry cement only, and data for some other countries may be incomplete. For some countries, the production data may include exports of clinker.

World production of hydraulic cement declined by 2.1% in 2015 to 4.1 Gt; based on previous editions of the Minerals Yearbook, this was the first decrease since the end of World War II. The decline was largely because of a 5.3% drop in production, to 2.36 Gt, by China, by far the world’s leading producer. China’s output was nearly eightfold that of India, which had the second highest output. The remaining top 15 producers in 2015 were, in descending order, the United States, Turkey, Vietnam, Brazil, Russia, Saudi Arabia, Indonesia, Iran, Japan, Egypt, the Republic of Korea, Mexico, and Thailand. Altogether, cement was produced in about 160 countries, but output was very unevenly distributed. Cumulatively, the top 5 countries accounted for about 70% of total world output; the top 10 countries, about 78%; and the top 15 countries, about 84%.

In terms of regional production, Asia and the Pacific in 2015 accounted for about 75% of the world total; the region included 7 of the 15 leading producing countries and has had the highest growth rate of all regions in recent years. China’s production accounted for almost 58% of the world total output in 2015 and was slightly higher than the entire world output (including that of China) in 2005. Relative to the United States, China’s production in 2015 was 56% of the total United States production in the 20th century, and China’s production for 2014–15 was 87% of the total United States output for 1900 through 2015. Similar superlatives apply to China’s cement consumption levels.

Western Europe (including Turkey) was the next ranked producing region, with 5.0% of 2015 world output, and was followed by Africa, with 4.8%; the Middle East, 4.7%; Central America and South America (including the Caribbean), 3.5%; North America (including Mexico), 3.3%; the Commonwealth of Independent States, 2.6%; and Eastern Europe, 1.1%.

Outlook

Cement sales increases in 2015 were lower than expected and had showed significant month-to-month relative variation. Accordingly, the industry was expecting only modest growth in sales of about 3% in 2016. The surge in imports of cement and capture of market share by cement imports that characterized 2015 was expected to continue in 2016. Although several cement plant upgrades were expected to come online in 2016, initial production from these facilities would be constrained by rampup procedures, with little net increase in output for these plants likely during the year. A variety of factors, including emissions restrictions and competition from imported cement, were hindering the ability of plants to restart, or run at high capacity levels, a number of idle or intermittently operated kilns. Overall production of cement and clinker in 2016 was expected to show little increase from 2015 levels. In the intermediate term, and depending on the ultimate status of the currently idle kilns, kiln capacity utilization would likely increase. In the longer term, the poor overall (and deteriorating) condition of U.S. transportation infrastructure was expected to lead to increased levels of public sector construction spending. Given, however, the permitting difficulties in constructing new (greenfields) plants, domestic production capacity, even augmented by an increased use of SCMs (such as within blended cements), will be inadequate to supply a long-term return to high sales volumes comparable to those of the prerecession construction boom, and a growing share of the market will thus need to be supplied by imports.

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TABLE 1
SALIENT CEMENT STATISTICS^{1,2}

(Thousand metric tons unless otherwise specified)

	2011	2012	2013	2014	2015
United States:					
Production:					
Cement ³	67,895	74,151	76,804	82,535 ^r	84,405
Clinker	61,241	67,173	69,420	74,372	76,043
Shipments from mills and terminals: ^{3,4,5}					
Quantity	72,100	78,300	81,700	88,800 ^r	92,050
Value ⁶ thousand dollars	6,440,000	7,020,000	7,760,000	8,930,000 ^r	9,800,000
Average value ⁶ dollars per metric ton	89.50	89.50	95.00	100.50	106.50
Stocks, yearend:					
Cement	6,270	6,900	6,570	6,140	7,230
Clinker	4,620	4,870	5,090	4,530	4,840
Exports ⁷	1,414	1,749	1,670	1,404 ^r	1,288
Imports: ⁷					
Cement	5,812	6,107	6,289	7,584	10,376
Clinker	606	786	806	720	942
Total ⁸	6,418	6,893	7,095	8,303	11,318
Consumption, apparent ⁹	72,200	77,880	81,750	89,150 ^r	92,410
World, production ^{6,10}	3,630,000	3,820,000	4,070,000	4,190,000 ^r	4,100,000

^rEstimated. ^rRevised.

¹Unless otherwise indicated, data are for portland (including blended) and masonry cements only. Even where presented unrounded, data are thought to be accurate to no more than three significant digits.

²Excludes Puerto Rico.

³Includes cement made from imported clinker. Includes a double-counted component (less than 0.3% per year) of portland cement subsequently converted at the plants to masonry cement; because of the involvement of stockpiles, the precise amount converted from actual production cannot be determined.

⁴Includes imported cement.

⁵Shipments to final domestic customers. Data are from an annual survey of plants and terminals and may differ from the totals in table 9, which are based on consolidated monthly surveys from companies.

⁶Free on board mill or independently reporting terminal.

⁷All forms of hydraulic cement or clinker.

⁸May not add to totals shown because of independent rounding.

⁹Production (including that from imported clinker) of cement plus imports of cement minus exports of cement minus the change in yearend cement stocks.

¹⁰Total hydraulic cement. May include clinker exports for some countries.

TABLE 2
COUNTY BASIS OF SUBDIVISION OF STATES IN CEMENT TABLES

State subdivision	Defining counties
California, northern	Alpine, Fresno, Kings, Madera, Mariposa, Monterey, Tulare, Tuolumne, and all counties farther north.
California, southern	Inyo, Kern, Mono, San Luis Obispo, and all counties farther south.
Illinois, excluding Chicago	All counties other than those in metropolitan Chicago.
Illinois, metropolitan Chicago	Cook, DuPage, Kane, Kendall, Lake, McHenry, and Will Counties in Illinois.
New York, eastern	Delaware, Franklin, Hamilton, Herkimer, Otsego, and all counties farther east and south, except those within metropolitan New York.
New York, western	Broome, Chenango, Lewis, Madison, Oneida, St. Lawrence, and all counties farther west.
New York, metropolitan	New York City (Bronx, Kings, New York, Queens, and Richmond), Nassau, Rockland, Suffolk, and Westchester.
Pennsylvania, eastern	Adams, Cumberland, Juniata, Lycoming, Mifflin, Perry, Tioga, Union, and all counties farther east.
Pennsylvania, western	Centre, Clinton, Franklin, Huntingdon, Potter, and all counties farther west.
Texas, northern	Angelina, Bell, Concho, Crane, Culberson, El Paso, Falls, Houston, Hudspeth, Irion, Lampasas, Leon, Limestone, McCulloch, Reagan, Reeves, Sabine, San Augustine, San Saba, Tom Green, Trinity, Upton, Ward, and all counties farther north.
Texas, southern	Brazos, Burnet, Crockett, Jasper, Jeff Davis, Llano, Madison, Mason, Menard, Milam, Newton, Pecos, Polk, Robertson, San Jacinto, Schleicher, Tyler, Walker, Williamson, and all counties farther south.

TABLE 3
PORTLAND AND BLENDED CEMENT PRODUCTION, CAPACITY, AND STOCKS IN THE UNITED STATES, BY DISTRICT¹

(Thousand metric tons unless otherwise specified)

District ²	2014						2015					
	Number of plants	Production ³	Grinding capacity ⁴	Percent utilized ⁵	Yearend stocks ⁶	Number of plants	Production ³	Grinding capacity ⁴	Percent utilized ⁵	Yearend stocks ⁶		
Maine and New York	4	1,736	3,184	54.5	217	4	1,764	3,184	55.4	174		
Pennsylvania	8	3,828	6,069	63.1	248 ⁷	8	3,919	5,992	65.4	255		
Illinois	3	1,223	2,532	48.3	142	3	1,411	2,532	55.7	170		
Indiana	4	2,397	3,735	64.2	115	4	2,562	3,740 ⁷	68.6 ⁷	254		
Michigan	3	3,951	5,224	75.6	319	3	4,191	5,220 ⁷	80.2 ⁷	405 ⁷		
Ohio	2	864	1,208	71.5	30	2	916	1,208	75.9	42		
Iowa, Nebraska, South Dakota	4	3,170	4,453	71.2	372	4	3,286	4,346	75.6	389		
Kansas	2	2,012	3,172	63.4	162	2	2,141	3,172	67.5	166		
Missouri	5	8,782	11,218	78.3	519 ⁷	5	8,535	11,500 ⁷	74.2 ⁷	962 ⁷		
Florida	8	4,987	9,770 ⁷	51.1 ⁷	360	8	5,499	10,100 ⁷	54.5 ⁷	338		
Georgia, Maryland, Virginia, West Virginia	6	5,587	7,358	75.9	391	6	5,680	7,358	77.2	364		
South Carolina	3	2,888	5,085	56.8	101	3	3,069	5,090 ⁷	60.4 ⁷	219		
Alabama, Kentucky, Mississippi, Tennessee	8	6,596	10,100 ⁷	65.0 ⁷	510	8	7,008	10,100 ⁷	69.1 ⁷	582		
Arkansas and Oklahoma	4	2,459	3,729	65.9	212	4	2,429	3,729	65.1	203		
Texas, northern	6	4,675	7,830 ⁷	59.7 ⁷	291	6	4,490	7,400 ⁷	60.7 ⁷	395		
Texas, southern	5	6,308	7,730	81.6	325	5	5,886	7,730	76.1	359		
Arizona and New Mexico	4	2,030	3,715	54.6	104	4	2,333	3,715	62.8	127		
Colorado and Wyoming	4	3,187	4,889	65.2	197	4	3,197	4,889	65.4	243		
Idaho, Montana, Nevada, Utah	5	2,351	3,232	72.7	212	5	2,482	3,223	77.0	283		
Alaska and Hawaii	--	--	--	--	54	--	--	--	--	73		
California	9	9,812	12,080	81.2	542	9	9,772	12,050	81.1	366		
Oregon and Washington	4	1,472	2,399	61.4	216 ⁷	4	1,524	2,472	61.6	223 ⁷		
Importers ⁸	--	--	--	--	129 ⁷	--	--	--	--	234 ⁷		
Total ⁹	101	80,315	119,000 ⁷	67.6 ⁷	5,770 ⁷	101	82,093	119,000 ⁷	69.1 ⁷	6,830 ⁷		
Puerto Rico	2	588	1,780	33.2	41 ⁷	2	536	1,780	30.1	59		
Grand total ⁹	103	80,904	121,000 ⁷	67.1 ⁷	5,810 ⁷	103	82,629	121,000 ⁷	68.5 ⁷	6,890 ⁷		

-- Zero.

¹Even where presented unrounded, data are thought to be accurate to no more than three significant digits. Includes data for white cement. Includes cement made from imported clinker.

²District assignment is the location of the reporting facilities. Specific districts include importers where district assignments were possible.

³Data include a small amount of portland cement subsequently consumed at the plant to make masonry cement; the amount thus double-counted cannot be determined precisely because of the involvement of cement stockpiles, but is less than 0.3% of the grand totals listed.

⁴Based on fineness needed to produce a plant's normal output mix, including masonry cement, and allowing for downtime for routine maintenance.

⁵Calculated relative to portland and blended cement output; utilization would be higher if calculated to include output of masonry cement.

⁶Includes stocks of domestic and imported cement at mills, terminals, and in transit.

⁷Includes estimates for nonrespondents or facilities that provided incomplete information; data have been rounded to three significant digits.

⁸Includes only those importers or terminals for which district assignments were not possible.

⁹May not add to totals shown because of independent rounding.

TABLE 4
MASONRY CEMENT PRODUCTION AND STOCKS IN THE UNITED STATES, BY DISTRICT¹

(Thousand metric tons unless otherwise specified)

District ²	2014			2015		
	Number of active plants	Production ³	Yearend stocks ⁴	Number of active plants	Production ³	Yearend stocks ⁴
Maine and New York	4	31	13	4	38	16
Pennsylvania	7	152 ^r	44 ⁵	7	179	39 ⁵
Indiana and Ohio	6	273	39	6	262	42
Michigan	2	43	17	3	92	30
Iowa, Nebraska, South Dakota	1	W	W	--	W	W
Kansas	2	W	W	2	W	W
Missouri	1	W	W	1	W	W
Florida	6	365	51	5	400	41
Georgia, Maryland, Virginia, West Virginia	5	262	38	5	269	34
South Carolina	3	160	16	3	168	14
Alabama, Kentucky, Tennessee	6	255	56	6	245	47
Arkansas and Oklahoma	4	124	16	4	118	49
Texas	7	277	17	6	268	17
Arizona and New Mexico	3	48	6	3	46	5
Colorado and Wyoming	1	W	W	1	W	W
Idaho, Montana, Nevada, Utah	1	W	W	1	W	W
California	6	186	29	6	188	27
Importers ⁶	--	--	5 ⁵	--	--	5 ⁵
Total ⁷	65	2,220 ^r	375 ⁵	63	2,311	393 ⁵
Puerto Rico	--	--	--	--	--	--
Grand total ⁷	65	2,220 ^r	375 ⁵	63	2,311	393 ⁵

^rRevised. W Withheld to avoid disclosing company proprietary data; included in "Total." -- Zero.

¹Includes masonry, portland-lime, plastic, and stucco cements. Even where presented unrounded, data are thought to be accurate to no more than three significant digits.

²District assignment is the location of the reporting facilities. Specific districts include importers where district assignments were possible.

³Includes cement produced from imported clinker.

⁴Includes imported cement.

⁵Includes estimates for nonrespondents or facilities that provided incomplete information.

⁶Includes only those importers or terminals for which district assignments were not possible.

⁷May not add to totals shown because of independent rounding.

TABLE 5
CLINKER CAPACITY AND PRODUCTION IN THE UNITED STATES IN 2015, BY DISTRICT¹

District	Number of active plants ²			Number of kilns ³	Daily capacity ^{3,4} (thousand metric tons)	Average days of routine maintenance ⁵	Apparent annual capacity ^{3,6} (thousand metric tons)	Production (thousand metric tons)	Percent of capacity utilized	Year-end stocks (thousand metric tons)
	Process used		Total							
	Dry	Wet								
Maine and New York	2	1	--	3	4	9.6 ⁸	21.3 ⁸	1,513	45.4 ⁸	109
Pennsylvania	5	2	--	7	11	16.9	34.3 ⁸	3,573	64.3 ⁸	140
Illinois	3	--	--	3	6	7.7	36.8 ⁸	1,451	56.5 ⁸	138
Indiana	3 ⁹	1	--	4	8	9.9	22.2	2,503	73.9	137
Michigan	2	--	--	2	6	11.2	24.3	3,292	86.9	127
Ohio	1	1	--	2	3	3.3	23.6	905	80.5	63
Iowa, Nebraska, South Dakota	4	--	--	4	5	10.3	21.8 ⁸	3,550 ⁸	82.3 ⁸	206
Kansas	2	--	--	2	3	7.3	28.7	1,942	79.2	90
Missouri	5	--	--	5	5	29.3	30.6	7,962	82.3	453
Florida	7	--	--	7	10	25.8	18.2	8,907	58.9	270
Georgia, Maryland, Virginia, West Virginia	5	--	--	5	5	19.4	30.4	6,475	83.1	303
South Carolina	3	--	--	3	3	12.2	34.3 ⁸	4,030 ⁸	70.5 ⁸	61
Alabama, Kentucky, Tennessee	8	--	--	8	8	26.6	27.7	6,527	73.2	249
Arkansas and Oklahoma	3	1	--	4	8	9.8	27.2	3,293	68.3	182
Texas, northern	5 ⁹	1	--	6	10	19.4	31.1 ⁸	6,380 ⁸	67.0 ⁸	317
Texas, southern	5	--	--	5	7	20.3	17.9 ⁸	7,050 ⁸	79.9 ⁸	435
Arizona and New Mexico	4	--	--	4	8	10.4	20.5	3,513	62.4	273
Colorado and Wyoming	4	--	--	4	5	11.9	22.8	3,967	75.0	212
Idaho, Montana, Nevada, Oregon, Utah, Washington	5	2	--	7	8	12.6	24.3 ⁸	4,310 ⁸	85.2 ⁸	504
California	8	--	--	8	9	34.6	27.6	11,828	76.1	576
Total ¹⁰	84 ⁹	9	--	93	132	309.0 ⁸	26.2 ⁸	104,000 ⁸	73.0 ⁸	4,840
Puerto Rico	2	--	--	2	2	5.0	32.0 ⁸	1,680 ⁸	31.9 ⁸	122
Grand total ¹⁰	86 ⁹	9	--	95	134	314.0 ⁸	26.3 ⁸	106,000 ⁸	72.4 ⁸	4,970

-- Zero.

¹Even where presented unrounded, data are thought to be accurate to no more than three significant digits.

²Includes all plants (gray or white) that produced clinker for at least 1 day during the year, as well as idle facilities able to be restarted, fully permitted, in less than 6 months.

³Includes kilns active for at least 1 day during the year. For kilns idle all year, excludes those that cannot be restarted, fully permitted, in less than 6 months.

⁴Sum of reported kiln capacities for all plants in a district.

⁵Total days of routine maintenance (summed for all kilns) divided by the number of kilns.

⁶Sum of apparent annual capacities for all kilns. For each kiln, the statistic is calculated as 365 days minus days reported for routine maintenance and then multiplied by the unrounded daily capacity.

⁷Plants that operated, or can operate, both wet and dry kilns, whether or not both types were active during the year. Includes plants being converted from wet to dry technology.

⁸Contains estimates for some facilities, and data have been rounded to no more than three significant digits.

⁹Includes one semiwet kiln in Indiana and one semidry kiln in northern Texas.

¹⁰May not add to totals shown because of independent rounding.

TABLE 6
RAW MATERIALS USED TO PRODUCE CLINKER AND CEMENT IN THE UNITED STATES^{1,2}

(Thousand metric tons)

Material	2014		2015	
	Clinker	Cement ³	Clinker	Cement ³
Calcareous:				
Limestone (aragonite, chalk, coral, marble)	97,300	2,350	97,700	2,470
Cement rock (includes marl)	9,340	15	9,450	8
Cement kiln dust (CKD) ⁴	26	101	19	157
Lime	30	13	48	13
Other	95	1	98	(5)
Aluminous:				
Clay	3,610	1	4,070	--
Shale and schist	2,010	43	2,580	45
Other ⁶	612	--	705	--
Ferrous:				
Iron ore	812	--	816	--
Mill scale	649	--	695	--
Other ⁷	25	--	17	--
Siliceous:				
Sand, calcium silicates	3,330	--	3,430	--
Sandstone, quartzite, soils, nonpozzolanic rocks	697	--	705	--
Fly ash	2,440	160	2,280	128
Other ash, including bottom ash	1,580	--	1,710	--
Granulated blast furnace slag ⁸	--	287	1	296
Other blast furnace slag	56	--	27	--
Steel slag	357	--	409	--
Other slag	247	--	223	--
Natural rock pozzolans ⁹	--	35	--	30
Other pozzolans ¹⁰	10	8	64	11
Other:				
Gypsum and anhydrite	(11)	4,380	(11)	4,390
Miscellaneous ¹²	46	29	27	28
Total¹³	123,000	7,430	125,000	7,580
Clinker, imported, raw materials equivalent¹⁴	--	1,380	--	1,520
Grand total¹³	123,000	8,810	125,000	9,090

-- Zero.

¹Excludes Puerto Rico.

²Data have been rounded to no more than three significant digits.

³Includes portland, blended, and masonry cements.

⁴Data are thought to be underreported.

⁵Less than 500 metric tons.

⁶Includes alumina, aluminum dross, bauxite, spent catalysts, and other aluminous materials.

⁷Includes iron sludges, pyrite, and other ferrous materials.

⁸Includes both ground and unground material.

⁹Includes pozzolana and burned clays or shales (except where directly reported as clay or shale).

¹⁰Includes diatomite, silica fume, other microcrystalline silica, and other pozzolans, even if not used as such.

¹¹Included with "Calcareous: Other."

¹²Includes fluorspar and all other materials not listed earlier.

¹³May not add to totals shown because of independent rounding.

¹⁴Converted as 1.7 times the weight of foreign clinker consumed.

TABLE 7
CLINKER PRODUCED AND FUEL CONSUMED BY THE U.S. CEMENT INDUSTRY, BY KILN PROCESS¹

Kiln process	Production ²			Conventional fuels ³				Waste fuels ³		
	Number of plants ⁴	Quantity (thousand metric tons)	Percent of total	Coal ⁵ (thousand metric tons)	Petcoke (thousand metric tons)	Oil ⁶ (thousand liters)	Natural gas ⁷ (thousand cubic meters)	Tires (thousand metric tons)	Solid (thousand metric tons)	Liquid (thousand liters)
2014:										
Wet	9	2,458	3.3	340	87	3,770	45,200	20	7	146,000
Dry ⁸	81	71,914	96.7	6,340	1,610	19,300	524,000	361	1,280	582,000
Both ^{9, 10}	1	W	W	W	W	W	W	W	W	W
Total ¹¹	91	74,372	100.0	6,680	1,700	23,100	569,000	381	1,290	728,000
2015:										
Wet	9	2,536	3.3	458	48	3,460	110,000	22	29	197,000
Dry ⁸	83	73,507	96.7	5,850	1,640	24,100	874,000	376	991	950,000
Both ¹⁰	--	--	--	--	--	--	--	--	--	--
Total ¹¹	92	76,043	100.0	6,310	1,690	27,600	984,000	397	1,020	1,150,000

W Withheld to avoid disclosing company proprietary data. -- Zero.

¹Excludes Puerto Rico.

²Data are all reported. Although unrounded, data are thought to be accurate to no more than three significant digits.

³All fuel data have been rounded to no more than three significant digits.

⁴Excludes idle plants that, although retained as active in terms of clinker capacity, had no production during 2014–15.

⁵All reported to be bituminous.

⁶Distillate and residual fuel oils. Excludes used oils that were reported under liquid wastes.

⁷Includes landfill gas and propane.

⁸Includes one semiwet plant and one semidry plant.

⁹Data for the category “Both” have been included in those for “Dry” plants to protect company proprietary information.

¹⁰Plants that can operate both wet and dry kilns, whether or not both types were active during the year. Includes plants that converted from wet to dry technology during the year.

¹¹May not add to totals shown because of independent rounding.

TABLE 8
ELECTRICITY CONSUMED BY U.S. CEMENT PLANTS, BY PLANT PROCESS¹

Plant process	Electricity consumed ²							Cement produced ³ (thousand metric tons)	Average consumption (kilowatthours per ton of cement produced)
	Generated		Purchased		Total ⁴				
	Number of plants	Quantity (million kilowatthours)	Number of plants	Quantity (million kilowatthours)	Number of plants	Quantity (million kilowatthours)	Percent of total		
2014:									
Integrated plants:									
Wet	--	--	9	414	9	414	4	2,818	147
Dry ^{5,6}	4	215	82 ⁷	10,700	82	10,900	96	78,317 ^r	139
Both ^{6,8}	--	--	1	W	1	W	W	W	W
Total or average ³		215	92 ⁷	11,100	92	11,300	100	81,135 ^r	139
Grinding plants ⁹	--	--	4	121	4	121	--	1,284	94
Exclusions ¹⁰	--	--	2	XX	2	XX	--	116	XX
2015:									
Integrated plants:									
Wet	--	--	9	438	9	438	4	2,950	149
Dry ⁵	4	239	84 ⁷	10,800	84	11,000	96	80,146	137
Both ⁸	--	--	--	--	--	--	--	--	--
Total or average ³		239	93 ⁷	11,200	93	11,400	100	83,096	138
Grinding plants ⁹	--	--	4	116	4	116	--	1,187	97
Exclusions ¹⁰	--	--	2	XX	2	XX	--	122	XX

^rRevised. W Withheld to avoid disclosing company proprietary data. XX Not applicable. -- Zero.

¹Excludes Puerto Rico.

²Data are rounded to no more than three significant digits because they contain estimates.

³Portland and masonry cement. Data are all reported and are unrounded but are thought to be accurate to no more than three significant digits.

⁴May not add to totals shown because of independent rounding.

⁵Includes one semiwet plant and one semidry plant.

⁶Data for the category "Both" have been included in those for "Dry" plants to protect company proprietary information.

⁷Includes one grinding plant whose data were included with an integrated plant.

⁸Plants that can operate both wet and dry kilns, whether or not both types were active during the year. Includes plants that converted from wet to dry technology during the year.

⁹Plants that did not produce clinker but ground clinker from outside sources. Excludes plants that only made masonry cement or just reground one type of portland cement into another, or which reported a substantial component of grinding of excess granulated blast furnace slag.

¹⁰Plants at which production of portland cement was by regrinding of one type into another or which reported production only of masonry cement.

TABLE 9
CEMENT SHIPMENTS TO FINAL CUSTOMER, BY DESTINATION AND ORIGIN^{1,2}

(Thousand metric tons)

Destination and origin	Portland cement		Masonry cement	
	2014	2015	2014	2015
Destination:				
Alabama	962	996	69	71
Alaska ³	169	154	--	--
Arizona	1,804	2,020	21	26
Arkansas	846	807	44	44
California, northern	3,078	3,436	39	32
California, southern	5,545	5,998	165	173
Colorado	2,071	2,094	5	5
Connecticut ³	538	581	12	14
Delaware ³	176	231	5	5
District of Columbia ³	181	238	--	(4)
Florida	5,486	5,929	383	412
Georgia	2,249	2,628	137	141
Hawaii ³	332	408	2	2
Idaho ³	435	498	(4)	(4)
Illinois, excluding Chicago	1,378	1,418	8	9
Illinois, metropolitan Chicago ³	1,519	1,672	18	19
Indiana	1,694	1,892	37	34
Iowa	1,928	1,895	1	1
Kansas	1,260	1,301	5	4
Kentucky	1,021	1,116	52	52
Louisiana ³	2,052	2,154	51	49
Maine	190	194	1	1
Maryland	1,174	1,229	35	34
Massachusetts ³	905	929	9	9
Michigan	1,840	1,968	53	54
Minnesota ³	1,478	1,656	6	5
Mississippi ³	788	697	35	35
Missouri	1,543	1,644	13	12
Montana	321	313	1	(4)
Nebraska	1,260	1,309	1	(4)
Nevada	1,111	1,132	7	5
New Hampshire ³	190	199	7	7
New Jersey ³	1,379	1,434	41 ^r	45
New Mexico	603	504	2	2
New York, eastern	484	535	7	8
New York, western ³	654	655	12	10
New York, metropolitan ³	1,413	1,658	50 ^r	50
North Carolina ³	2,081	2,028	146	148
North Dakota ³	1,112	1,041	--	(4)
Ohio	3,055	3,144	73	74
Oklahoma	1,747	1,624	26	26
Oregon	700	770	(4)	(4)
Pennsylvania, eastern	1,594	1,686	36 ^r	41
Pennsylvania, western	1,103	1,032	29	27
Rhode Island ³	111	95	1	1
South Carolina	1,196	1,386	66	67
South Dakota	460	478	--	--
Tennessee	1,378	1,469	125	128
Texas, northern	6,561	5,940	117	117
Texas, southern	8,320	8,405	204	207
Utah	1,196	1,226	(4)	(4)
Vermont ³	122	99	1	(4)
Virginia	1,653	1,664	71	73
Washington	1,678	1,750	(4)	(4)
West Virginia	490	414	12	9

See footnotes at end of table.

TABLE 9—Continued
CEMENT SHIPMENTS TO FINAL CUSTOMER, BY DESTINATION AND ORIGIN^{1,2}

(Thousand metric tons)

Destination and origin	Portland cement		Masonry cement	
	2014	2015	2014	2015
Destination:—Continued				
Wisconsin ³	1,720	1,873	12	12
Wyoming	355	346	--	--
Total ⁵	86,688	89,991	2,251 ^r	2,304
Destination:				
Puerto Rico	637	575	--	--
Foreign countries ⁶	1,062	981	5	(4)
Grand total ⁵	88,387	91,547	2,256 ^r	2,305
Origin:				
United States	80,424	81,400	2,235 ^r	2,284
Puerto Rico	595	528	--	--
Foreign countries ⁷	7,368	9,619	21	21
Total shipments ⁵	88,387	91,547	2,256 ^r	2,305

^rRevised. -- Zero.

¹Includes cement produced from imported clinker and imported cement shipped by domestic producers and importers. Data include all revisions available as of February 24, 2017.

²Data are developed from consolidated monthly surveys of shipments by companies and may differ from data in tables 1, 10–12, and 14–15, which are from annual surveys of individual plants and importers. Although unrounded, data are thought to be accurate to no more than three significant digits.

³Has no cement plants.

⁴Less than ½ unit.

⁵May not add to totals shown because of independent rounding.

⁶Includes shipments to U.S. possessions and territories.

⁷Imported cement sold to final customers in the United States as reported by domestic producers and other importers. Data do not match the imports in tables 17–20.

TABLE 10
SHIPMENTS OF PORTLAND CEMENT IN THE UNITED STATES, BY TYPE OF CARRIER^{1,2}

(Thousand metric tons)

Type of carrier	Plant to terminal		Plant to customer		Terminal to customer		Total to customers ³
	In bulk	In bags ⁴	In bulk	In bags ⁴	In bulk	In bags ⁴	
2014:							
Railroad	13,300	5	1,130	4	139	5	1,280
Truck	3,960	72	43,800	783	40,300	316	85,200
Barge and boat	9,450	--	121	--	--	--	121
Total ⁴	26,700	77	45,000	787	40,400	322	86,600 ⁵
2015:							
Railroad	13,600	9	1,140	--	147	6	1,290
Truck	4,210	55	45,400	713	42,000	320	88,400
Barge and boat	9,590	--	40	--	--	--	40
Total ⁴	27,400	63	46,600	713	42,100	326	89,700 ⁵

-- Zero.

¹Includes imported cement and cement made from imported clinker. Excludes Puerto Rico.

²Data are rounded to no more than three significant digits.

³May not add to totals shown because of independent rounding.

⁴Includes packages, bags, and supersacks.

⁵Shipments are based on an annual survey of plants and importers; may differ from totals in table 9, which are based on consolidated monthly data.

TABLE 11
PORTLAND CEMENT SHIPPED IN THE UNITED STATES, BY DISTRICT¹

District ²	2014			2015		
	Quantity ³ (thousand metric tons)	Value ⁴		Quantity ³ (thousand metric tons)	Value ⁴	
		Total (thousands)	Average (per metric ton)		Total (thousands)	Average (per metric ton)
Maine and New York	1,965	\$201,515	\$102.54	2,023	\$219,823	\$108.67
Pennsylvania	4,333	398,000 ⁵	92.00 ⁵	4,449	449,000 ⁵	101.00 ⁵
Illinois	1,631	167,644	102.78	1,281	138,790	108.35
Indiana	2,111	183,115	86.74	2,606	258,207	99.09
Michigan	4,694	473,980	100.97	4,669	523,500	112.13
Ohio	879	91,311	103.90	909	102,794	113.07
Iowa, Nebraska, South Dakota	3,966	435,321	109.76	4,174	485,379	116.27
Kansas	1,592	159,520	100.20	1,510	146,319	96.87
Missouri	6,945	667,650	96.13	7,463	742,551	99.50
Florida	5,250	476,566	90.77	5,647	566,288	100.29
Georgia, Maryland, Virginia, West Virginia	5,059	477,612	94.40	5,551	498,176	89.74
South Carolina	2,888	272,958	94.52	2,840	293,803	103.44
Alabama, Kentucky, Tennessee	6,838	640,150	93.61	6,312	638,166	101.11
Arkansas and Oklahoma	2,357	235,047	99.70	2,382	244,629	102.71
Texas, northern	6,377	691,000 ⁵	108.50 ⁵	6,274	701,000 ⁵	111.50 ⁵
Texas, southern	7,731	817,595	105.76	7,005	829,486	118.42
Arizona and New Mexico	2,202	228,832	103.92	2,562	263,507	102.85
Colorado and Wyoming	2,554	297,534	116.51	2,701	339,114	125.57
Montana, Nevada, Utah	2,311	239,110	103.49	2,560	283,734	110.84
Alaska and Hawaii	448	68,204	152.12	518	77,870	150.31
California	9,301	785,881	84.50	10,108	917,490	90.77
Oregon and Washington	1,931	204,000 ⁵	105.50 ⁵	2,036	219,000 ⁵	108.00 ⁵
Importers ⁶	3,200 ⁵	385,000 ⁵	120.50 ⁵	4,140 ⁵	504,000 ⁵	121.50 ⁵
Total or average ⁷	86,600 ⁵	8,600,000 ⁵	99.50 ⁵	89,700 ⁵	9,440,000 ⁵	105.00 ⁵
Puerto Rico	631	W	W	569 ⁵	W	W
Grand total ⁷	87,200	W	W	90,300 ⁵	W	W

W Withheld to avoid disclosing company proprietary data.

¹Includes gray and white portland cement. Includes cement made from imported clinker. Even where presented unrounded, data are thought to be accurate to no more than three significant digits.

²The location of the reporting entities, not necessarily the location of sales (see table 9 for sales data, by State). Specific districts include shipments by importers where district assignments were possible.

³Tonnages are those by reporting entities in the district but may include shipments into other districts. They differ from the data in table 9, which are the actual reported sales into the specific States.

⁴Values are mill net or ex-plant (free on board) valuations of total sales to final customers, including sales from plants' external distribution terminals. The data are ex-terminal for independently reporting terminals. Data include all varieties of portland cement and both bulk and bag shipments. Unless otherwise specified, data are presented unrounded. Unrounded or not, unit value data should be viewed as value indicators, accurate to no more than the nearest \$0.50 or \$1.00 per metric ton.

⁵Data are rounded to three significant digits (unit values to the nearest \$0.50) because they include estimates.

⁶Importers for which district assignments were not possible.

⁷May not add to totals shown because of independent rounding.

TABLE 12
MASONRY CEMENT SHIPPED IN THE UNITED STATES, BY DISTRICT^{1,2}

District ³	2014			2015		
	Quantity ⁴ (thousand metric tons)	Value ⁵		Quantity ⁴ (thousand metric tons)	Value ⁵	
		Total (thousands)	Average (per metric ton)		Total (thousands)	Average (per metric ton)
Maine and New York	41	\$5,375	\$132.63	44	\$5,742	\$130.12
Pennsylvania	166 ^r	24,100 ^{r,6}	145.00 ^{r,6}	185	27,400 ⁶	148.50 ⁶
Illinois, Indiana, Ohio	240	37,325	155.76	233	37,999	162.74
Michigan	76 ⁶	10,800 ⁶	143.00 ⁶	82 ⁶	12,400 ⁶	152.50 ⁶
Iowa, Nebraska, South Dakota	(7)	45	105.08	--	--	--
Kansas and Missouri	33	5,303	162.84	38	6,582	173.45
Florida	363	47,400 ⁶	130.50 ⁶	395	51,200 ⁶	129.50 ⁶
Georgia, Maryland, Virginia, West Virginia	231	44,219	191.06	236	47,809	202.36
South Carolina	168	24,900 ⁶	148.00 ⁶	174	27,000 ⁶	155.50 ⁶
Alabama, Kentucky, Mississippi, Tennessee	327	47,380	144.69	325	48,996	150.77
Arkansas and Oklahoma	95	10,743	112.88	87	9,593	110.41
Texas	264	41,400 ⁶	156.50 ⁶	260	44,900 ⁶	172.50 ⁶
Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming	32	3,959	123.90	35	4,191	121.46
Alaska and Hawaii	2	490	322.09	2	511	332.78
California, Oregon, Washington	212	22,900 ⁶	108.00 ⁶	210	23,300 ⁶	111.00 ⁶
Importers ⁸	20 ⁶	4,200 ⁶	214.00 ⁶	22	4,750 ⁶	219.50 ⁶
Total or average ⁹	2,270 ^{r,6}	331,000 ^{r,6}	145.50 ⁶	2,330	352,000 ⁶	151.50 ⁶
Puerto Rico	--	--	--	--	--	--
Grand total or average ⁹	2,270 ^{r,6}	331,000 ^{r,6}	145.50 ⁶	2,330	352,000 ⁶	151.50 ⁶

^rRevised. -- Zero.

¹Shipments are those by cement companies to final customers and include imported cement and masonry cement made from imported clinker. Excludes sales of portland cement final customers who made masonry cement from purchased portland cement. Data exclude Puerto Rico. Even where presented unrounded, data are thought to be accurate to no more than three significant digits.

²Data include true masonry, plastic, portland-lime, and stucco cements.

³District is the location of the reporting entities, not necessarily the location of sales (see table 9 for sales data, by State). Specific districts include shipments by importers where district assignments were possible.

⁴Tonnages are those by reporting entities in the district but may include shipments into other districts. They differ from the data in table 9, which are the actual reported sales into the specific States.

⁵Values are mill net or ex-plant valuations of total sales to final customers, including sales from plants external distribution terminals. The data are ex-terminal for independently reporting terminals. Data include both bulk and bag shipments. Unless otherwise specified, data are presented unrounded. Unrounded or not, unit value data should be viewed as value indicators, accurate to no more than the nearest \$0.50 or even \$1.00 per metric ton.

⁶Data are rounded to no more than three significant digits (unit values to the nearest \$0.50) because they include estimates.

⁷Less than 500 metric tons.

⁸Importers for which district assignments were not possible.

⁹May not add to totals shown because of independent rounding.

TABLE 13
AVERAGE MILL NET VALUE OF CEMENT SOLD IN THE UNITED STATES^{1,2}

(Dollars per metric ton)

Year	Portland cement			Masonry cement	All cement
	Gray	White ³	All		
2014	98.50	202.00	99.50	145.50	100.50
2015	104.50	211.00	105.00	151.50	106.50

¹Values are average of sales to final customers, free on board the plant or the independently reporting terminal. Values include any bagging charges, but exclude delivery charges to customers or to external terminals. Data exclude Puerto Rico.

²Data are rounded to the nearest \$0.50 per metric ton.

³Data for white cement include a component of resales showing significant price markups.

TABLE 14
PORTLAND CEMENT SHIPMENTS IN 2015, BY DISTRICT AND TYPE OF CUSTOMER¹

(Thousand metric tons)

District ²	Ready- mixed concrete	Concrete product manufacturers	Contractors	Building material dealers	Oil well, mining, waste stabilization	Government and other ³	Total ^{4,5}
Maine and New York	1,430	301	51	169	2	73	2,023
Pennsylvania	2,530	1,010	457	211	61	173	4,449
Illinois	812	52	106	5	178	128	1,281
Indiana	1,920	387	174	9	42	71	2,606
Michigan	3,560	437	487	170	10	9	4,669
Ohio	696	56	57	19	80	--	909
Iowa, Nebraska, South Dakota	3,280	445	329	14	106	5	4,174
Kansas	1,190	153	111	31	29	--	1,510
Missouri	6,100	539	542	140	121	20	7,463
Florida	4,120	1,020	209	137	3	161	5,647
Georgia, Maryland, Virginia, West Virginia	3,960	957	422	75	12	123	5,551
South Carolina	2,220	305	189	116	1	10	2,840
Alabama, Kentucky, Mississippi, Tennessee	4,680	759	505	270	23	70	6,312
Arkansas and Oklahoma	1,830	167	239	24	109	10	2,382
Texas, northern	3,650	443	1,350	100	669	67	6,274
Texas, southern	4,940	685	687	191	434	71	7,005
Arizona and New Mexico	1,790	525	123	66	19	40	2,562
Colorado and Wyoming	2,150	150	278	29	90	2	2,701
Idaho, Montana, Nevada, Utah	1,780	217	153	86	279	46	2,560
Alaska and Hawaii	495	19	--	--	--	5	518
California	7,840	1,080	615	467	83	21	10,108
Oregon and Washington	1,530	235	153	76	32	5	2,036
Importers ⁶	3,090	401	239	65	93	255	4,140 ⁷
Total ⁵	65,600	10,400	7,470	2,470	2,480	1,360	89,700 ⁷
Puerto Rico	319	37	6	207	--	(8)	569 ⁷
Grand total ⁵	65,900	10,400 ⁹	7,480 ¹⁰	2,680	2,480 ¹¹	1,370 ¹²	90,300 ⁷

-- Zero.

¹Includes imported cement and cement made from imported clinker. Except for district totals, data have been rounded to three significant digits, but are likely accurate to only two significant digits. District totals are likely accurate to no more than three significant digits.

²The location of the reporting entity, not the location of sales (see table 9 for sales data, by State). Specific districts include shipments by importers where district assignments were possible.

³Includes shipments to miscellaneous customer types and for which customer types were not specified.

⁴Except where noted, district totals are unrounded but are thought to be accurate to no more than three significant digits.

⁵Data may not add to totals shown because of independent rounding.

⁶Shipments by importers where district assignments were not possible.

⁷District total has been rounded to three significant digits because it includes estimates.

⁸Less than ½ unit.

⁹Includes brick and block—3,110; precast and prestressed—3,670; pipe—1,060; and other or unspecified—2,560.

¹⁰Includes airport—134; road paving—3,760; soil cement—2,480; and other or unspecified—1,110.

¹¹Includes oil well drilling—1,910; mining—317; and waste stabilization—246.

¹²Includes other or unspecified—1,320.

TABLE 15
 PORTLAND CEMENT SHIPMENTS IN THE UNITED STATES, BY TYPE OF CEMENT^{1,2,3}

(Thousand metric tons)

Type of cement ⁴	2014	2015
General use and moderate heat (Types I and II) ^{5,6}	66,400	69,500
High early strength (Type III)	3,030	2,660
Sulfate resisting (Type V) ⁵	11,900	13,200
Block	177	199
Oil well	2,750	1,600
White ⁷	799	837
Blended: ⁸		
Portland, natural pozzolans	44	44
Portland, ground granulated blast furnace slag	652	745
Portland, fly ash	442	508
Portland, other pozzolans ⁹	420	439
Total blended ¹⁰	1,560	1,740
Expansive and regulated fast setting	--	--
Miscellaneous ¹¹	37	51
Grand total ¹⁰	86,600	89,700

-- Zero.

¹Includes sales of imported cement. Excludes Puerto Rico.

²Data are rounded to no more than three significant digits.

³Gray portland-type cements unless otherwise specified.

⁴Sold mostly under specifications ASTM C150, ASTM C595, and ASTM C1157.

⁵Type II/V and similar sulfate-resisting hybrids are included within Type V, as are HS and similar cements in ASTM C1157.

⁶Includes ASTM C1157 general use and moderate heat cements that contain no pozzolans.

⁷White portland-type cements. Most are Types I or II but may include Types III and V and block cements.

⁸Cements sold under ASTM C595 and those under ASTM C1157 that contain pozzolans.

⁹Includes blends with cement kiln dust, silica fume, other pozzolans, and limestone, and blends containing multiple pozzolans.

¹⁰Data may not add to totals shown because of independent rounding.

¹¹Includes low heat (Type IV), waterproof, and other portland-type cements.

TABLE 16
U.S. EXPORTS OF HYDRAULIC CEMENT AND CLINKER, BY COUNTRY¹

(Thousand metric tons and thousand dollars)

Country	2014		2015	
	Quantity	Value ²	Quantity	Value ²
Argentina	3	1,469 ^r	(3)	342
Australia	4	1,530	3	1,231
Bahamas, The	64	7,417 ^r	70	7,969
Brazil	6	3,562	2	1,677
Canada	1,031 ^r	157,384 ^r	942	136,954
Cayman Islands	(3)	101	1	257
Chile	3	734	2	564
China	1	279	6	1,006
Colombia	10	1,672	2	892
Dominican Republic	2	774	2	655
Germany	1	337	1	485
Guyana	18	1,784	18	1,878
Haiti	79	6,994	73	6,742
Honduras	(3)	148	1	191
India	1	1,075	(3)	280
Israel	1	436	1	311
Jamaica	77	8,577	71	7,886
Japan	7	1,574	6	1,156
Korea, Republic of	1	627	(3)	486
Kuwait	(3)	39	1	576
Mexico	57	16,023	63	29,606
Nigeria	1	432 ^r	(3)	45
Panama	9	1,470	1	693
Peru	1	205	(3)	98
Poland	2	764	--	--
Saudi Arabia	1	581	1	590
Taiwan	1	553	2	1,027
Thailand	1	475	1	174
Trinidad and Tobago	1	331	2	558
Turks and Caicos Islands	14	1,400	10	1,132
United Arab Emirates	2	385	1	317
United Kingdom	(3)	198	1	523
Venezuela	(3)	132	1	224
Other (82 countries)	7	4,782 ^r	6	3,596
Total ⁴	1,404 ^r	224,243 ^r	1,288	210,121
Puerto Rico:				
Aruba	2	432	4	656
British Virgin Islands	9	1,465	12	1,777
Curacao	8	892	6	892
Guadeloupe	3	3,002	5	3,738
Jamaica	--	--	2	218
Martinique	6	5,672	7	6,044
Netherlands	6	840	5	570
Other (3 countries)	(3) ^r	56 ^r	(3)	7
Total ⁴	35	12,359	40	13,901
Grand total ⁴	1,439 ^r	236,602 ^r	1,328	224,023

^rRevised. -- Zero.

¹Includes portland and masonry cements. Data are unrounded but are thought to be accurate to no more than three significant digits.

²Free alongside ship (f.a.s.) value. The value of exports at the U.S. seaport or border point of export is based on the transaction price, including inland freight, insurance, and other charges incurred in placing the merchandise alongside the carrier. The value excludes the cost of loading the carrier.

³Less than ½ unit.

⁴Data may not add to totals shown because of independent rounding.

Source: U.S. Census Bureau.

TABLE 17
U.S. IMPORTS FOR CONSUMPTION OF HYDRAULIC CEMENT AND CLINKER, BY COUNTRY¹

(Thousand metric tons and thousand dollars)

Country	2014			2015		
	Quantity	Value		Quantity	Value	
		Customs ²	C.i.f. ³		Customs ²	C.i.f. ³
Canada ⁴	3,739 ^r	295,365 ^r	304,745 ^r	4,497	356,721	366,353
China	856	47,706	67,847	1,620 ⁵	87,201 ⁵	119,403 ⁵
Colombia	36	1,532	1,663	16	558	653
Croatia	24	9,533	11,207	29	11,935	13,930
Denmark	100 ^r	10,455	13,083 ^r	159	17,536	20,960
Egypt	95	10,323	14,288	94	10,221	14,135
France	95	35,056	37,436	82	32,739	32,948
Germany	1	357	401	1	130	154
Greece	773	38,152	49,265	1,595	83,873	102,574
Italy	(6)	17	24	64 ⁷	1,292 ⁷	1,302 ⁷
Jamaica	6	2,108	2,170	7	2,549	2,549
Japan	1	686	858	2	836	1,165
Korea, Republic of	1,375	62,621	94,484	1,103	50,370	73,935
Malta and Gozo ⁸	15	790	1,298	25	1,200	1,788
Mexico ⁴	354	44,485 ^r	48,585 ^r	338	41,841	44,428
Netherlands	3	3,705	3,931	3	3,123	3,341
Norway	--	--	--	25	1,331	1,771
Poland	1	478	582	1	177	224
Portugal	--	--	--	20	2,341	2,366
Spain	(6)	69	87	270	18,111	22,913
Sweden	357	18,772	26,953	499	26,994	38,905
Taiwan	356	18,383	25,547	424	22,560	30,249
Thailand	14	1,828	2,809	11	1,439	2,284
Turkey ⁸	79	7,285	11,814	431	28,617	40,313
United Kingdom	1	365	443	1	433	555
Vietnam	18	1,008	1,256	--	--	--
Other (14 countries)	(6)	110 ^r	117 ^r	(6)	132	148
Total ^{4,9}	8,302 ^r	611,210 ^r	720,913 ^r	11,318 ⁵	804,291 ⁵	939,380 ⁵
Puerto Rico:						
Mexico	17	2,487	2,675	15	2,166	2,419
Portugal	(6)	30	42	1	128	188
Spain	71	5,457	6,862	102	7,378	9,193
Other (4 countries)	(6)	105	126	(6)	40	53
Total ⁹	89	8,080	9,705	117	9,712	11,852
Grand total ^{4,9}	8,391 ^r	619,289 ^r	730,618 ^r	11,435 ⁵	814,003 ⁵	951,232 ⁵

^rRevised. -- Zero.

¹Includes portland, masonry, and other hydraulic cements. Data are unrounded but are thought to be accurate to no more than three significant digits.

²Customs value. The price actually paid or payable for merchandise when sold for exportation to the United States, excluding U.S. import duties, freight, insurance, and other charges incurred in bringing the merchandise to the United States.

³Cost, insurance, and freight. The value represents the customs value plus insurance, freight, and other delivery charges to the first port of entry, but excludes costs of offloading, other U.S. port handling charges, and demurrage.

⁴Data are underreported with respect to clinker from Canada and cement from Mexico, owing to additional material coming in as "informal entries."

⁵Adjusted by the U.S. Geological Survey to add in 155,398 metric tons of cement, having a customs value of \$10,182,700 and a c.i.f. value of \$10,715,245, that was misreported by the importer under the tariff code for another commodity.

⁶Less than ½ unit.

⁷Material is believed to be mostly ground granulated blast furnace slag misreported by the importer as clinker.

⁸Malta and Gozo have no cement plants; material is believed to be from Turkey.

⁹Data may not add to totals shown because of independent rounding.

Source: U.S. Census Bureau.

TABLE 18

U.S. IMPORTS FOR CONSUMPTION OF HYDRAULIC CEMENT AND CLINKER, BY CUSTOMS DISTRICT AND COUNTRY¹

(Thousand metric tons and thousand dollars)

Customs district and country	2014			2015		
	Quantity	Value		Quantity	Value	
		Customs ²	C.i.f. ³		Customs ²	C.i.f. ³
Anchorage, AK:						
Canada	8	583	1,547	9	654	677
Korea, Republic of	119	5,335	8,775	115	5,333	8,512
Total ⁴	127	5,918	10,322	124	5,987	9,189
Baltimore, MD:						
China	2	101	116	2	181	249
Sweden	1	343	398	1	509	610
Other	(5)	53	58	(5)	63	80
Total ⁴	3	497	572	4	752	938
Boston, MA:						
Canada	--	--	--	114	7,747	7,747
Other	(5)	165	180	(5)	90	93
Total ⁴	(5)	165	180	114	7,837	7,840
Buffalo, NY:						
Canada	538	49,351	51,684	531	46,913	49,235
Germany	(5)	3	3	--	--	--
Total ⁴	538	49,354	51,687	531	46,913	49,235
Charleston, SC:						
United Kingdom	1	300	340	(5)	270	314
Other	(5)	9	11	(5)	84	134
Total ⁴	1	310	351	1	354	448
Chicago, IL: Other	(5)	426	474	1	277	307
Cleveland, OH:						
Canada	631	39,906	40,947	716	44,341	45,278
Netherlands	1	861	910	1	874	940
Poland	1	478	582	(5)	152	199
Other	(5)	199	273	(5)	342	402
Total ⁴	633	41,445	42,673	718	45,710	46,819
Columbia-Snake, OR, WA:						
Canada	28	1,728	1,798	38	3,074	3,174
China	383	19,332	26,715	458	23,576	33,161
Korea, Republic of	30	1,773	2,569	80	3,679	5,463
Thailand	--	5	6	--	--	--
Total ⁴	441	22,839	31,088	577	30,329	41,798
Dallas-Fort Worth, TX: China	(5)	11	19	(5)	130	156
Detroit, MI:						
Canada ⁶	1,013	79,760	81,958	1,244	96,072	98,298
Germany	--	--	--	1	13	14
Other	--	324	335	(5)	185	193
Total ^{4,6}	1,013	80,084	82,294	1,245	96,270	98,506
El Paso, TX:						
China	1	119	120	1	107	108
Mexico ⁶	100	13,985 ^r	15,253 ^r	114	16,170	17,353
Total ^{4,6}	101	14,104 ^r	15,373 ^r	114	16,277	17,461
Great Falls, MT:						
Canada	(5) ^r	79 ^r	89 ^r	47	3,733	3,828
Other	--	--	--	(5)	87	137
Total ⁴	(5) ^r	79 ^r	89 ^r	47	3,820	3,965
Honolulu, HI:						
Korea, Republic of	5	237	328	--	--	--
Taiwan	313	16,263	22,352	424	22,560	30,249
Vietnam	18	1,008	1,256	--	--	--
Other	(5)	16	18	(5)	8	13
Total ⁴	336	17,524	23,953	424	22,568	30,262
Houston-Galveston, TX:						
China	350	17,375	26,165	663	31,562	48,150
Colombia	35	1,397	1,469	12	465	489

See footnotes at end of table.

TABLE 18—Continued
 U.S. IMPORTS FOR CONSUMPTION OF HYDRAULIC CEMENT AND CLINKER, BY CUSTOMS DISTRICT AND COUNTRY¹

(Thousand metric tons and thousand dollars)

Customs district and country	2014			2015		
	Quantity	Value		Quantity	Value	
		Customs ²	C.i.f. ³		Customs ²	C.i.f. ³
Houston-Galveston, TX:—Continued						
Egypt	51	5,526	7,575	45	5,046	6,883
Greece	384	17,609	27,217	719	39,396	49,193
Korea, Republic of	670	30,332	47,152	338	15,532	23,973
Portugal	--	--	--	20	2,338	2,363
Spain	--	--	--	129	6,849	9,042
Taiwan	43	2,120	3,195	--	--	--
Turkey	12	1,171	2,251	329	21,485	29,766
Other	(5)	58	69	(5)	56	62
Total⁴	1,546	75,731	115,261	2,255	122,728	169,921
Laredo, TX:						
France	--	--	--	(5)	3	4
Mexico	146	19,093	19,514	157	21,931	22,591
Total⁴	146	19,093	19,514	157	21,934	22,594
Los Angeles, CA:						
China	27	2,993	4,465	25	2,719	3,584
Egypt	9	941	1,341	9	935	1,462
Thailand	8	977	1,503	5	660	1,051
Turkey	13	1,489	2,716	15	1,682	3,064
Other	1	354	413	(5)	212	250
Total⁴	57	6,753	10,438	55	6,208	9,411
Miami, FL:						
China	18	896	1,467	(5)	38	50
Egypt	20	2,178	3,049	27	2,883	3,954
Mexico	104	10,685	13,023	30	3,163	3,850
Spain	(5)	8	9	72	7,494	9,470
Sweden	355	17,687	25,675	310	16,408	23,353
Turkey	9	1,470	2,158	16	1,909	2,878
Other	(5)	8	8	(5)	48	52
Total⁴	506	32,933	45,390	455	31,943	43,607
Minneapolis, MN: Canada						
	135	16,502	16,534	133	16,172	16,192
Mobile, AL:						
China	(5)	79	91	--	--	--
Greece	--	--	--	71	4,368	4,392
Total⁴	(5)	79	91	71	4,368	4,392
New Orleans, LA:						
China	6	1,585	1,776	3	689	703
Croatia	24	9,436	11,069	27	11,319	13,159
Greece	--	--	--	50	2,388	2,982
Spain	--	--	--	49	2,388	2,982
Other	(5)	17	24	(5)	67	74
Total⁴	30	11,038	12,868	130	16,851	19,901
New York City, NY:						
Denmark	14	1,400	2,101	11	1,262	1,502
Greece	389	20,543	22,048	755	37,721	46,006
Malta and Gozo ⁷	15	790	1,298	--	--	--
Norway	--	--	--	25	1,331	1,771
Sweden	--	--	--	187	9,818	14,628
Turkey ⁷	43	2,821	4,192	3	461	672
Other	(5)	305	385	1	298	408
Total⁴	461	25,858	30,025	983	50,891	64,988
Nogales, AZ: Other						
	(5)	3	3	(5)	71	86
Norfolk, VA:						
Canada ⁸	--	--	--	29	1,840	1,841
China	2	1,137	1,287	2	1,176	1,336
Egypt	4	397	535	2	185	256

See footnotes at end of table.

TABLE 18—Continued
 U.S. IMPORTS FOR CONSUMPTION OF HYDRAULIC CEMENT AND CLINKER, BY CUSTOMS DISTRICT AND COUNTRY¹

(Thousand metric tons and thousand dollars)

Customs district and country	2014			2015		
	Quantity	Value		Quantity	Value	
		Customs ²	C.i.f. ³		Customs ²	C.i.f. ³
Norfolk, VA:—Continued						
France	95	34,942	37,311	82	32,614	32,758
Jamaica	6	2,108	2,170	7	2,549	2,549
Other	1 ^r	546 ^r	349 ^r	(5)	174	203
Total ⁴	108	38,890	41,652	122	38,537	38,941
Ogdensburg, NY:						
Canada	239	22,947 ^r	23,483 ^r	252	25,622	26,783
Other	(5)	8	9	(5)	3	5
Total ⁴	239	22,955 ^r	23,492 ^r	252	25,625	26,788
Pembina, ND: Canada						
	295	20,726	20,877	293	23,113	23,349
Philadelphia, PA:						
Croatia	--	--	--	1	482	598
Italy	--	--	--	64 ⁹	1,258 ⁹	1,262 ⁹
Korea, Republic of	192	8,334	11,534	140	5,735	6,240
Netherlands	1	1,432	1,342	1	1,311	1,421
Spain	--	--	--	19	1214	1224
Other	1	29	33	(5)	125	176
Total ⁴	193	9,796	13,109	225	10,126	10,920
Portland, ME: Canada						
	21	2,328	2,618	16	1,981	2,212
Providence, RI:						
Malta and Gozo ⁷	--	--	--	25	1,200	1,788
Turkey ⁷	--	--	--	25	1,225	1,375
Total ⁴	--	--	--	50	2,425	3,163
San Diego, CA: Mexico						
	5	722	794	38	577	634
San Francisco, CA:						
China	34	2,310	3,214	464 ¹⁰	26,620 ¹⁰	31,351 ¹⁰
Egypt	5	542	757	2	242	364
Thailand	6	819	1,259	6	738	1,171
Turkey	(5)	37	64	1	114	194
Other	(5)	197 ^r	215 ^r	(5)	86	141
Total ⁴	46	3,905	5,510	473 ¹⁰	27,800 ¹⁰	33,221 ¹⁰
Savannah, GA:						
Egypt	7	738	1,031	9	931	1,216
Turkey	--	--	--	40	1,560	2,096
Other	(5)	366	383	(5)	399	457
Total ⁴	7	1,104	1,413	49	2,890	3,769
Seattle, WA:						
Canada ⁶	733	49,987	50,741	922	67,104	68,073
China	33	1,596	2,196	(5)	36	40
Japan	1	305	405	1	496	696
Korea, Republic of	359	16,418	23,917	431	19,816	29,452
Other	(5)	106 ^r	156 ^r	(5)	157	223
Total ^{4,6}	1,126	68,413	77,415	1,355	87,609	98,483
St Albans, VT: Canada						
	97 ^r	11,467 ^r	12,467 ^r	152	18,355	19,667
St Louis, MO: Other						
	1	455	512	1	248	263
Tampa, FL:						
Denmark	87 ^r	9,035	10,960 ^r	148	16,274	19,458
Turkey	2	292	422	1	160	233
Other	(5)	12	15	(5)	60	69
Total ⁴	88 ^r	9,339	11,397 ^r	150	16,494	19,760
U.S. Virgin Islands: Colombia						
	1	135	193	4	93	164
Washington, DC: Sweden						
	--	--	--	(5)	3	4
Wilmington, NC: Other						
	(5)	229	260	(5)	25	27
Total ^{4,6}	8,303	616,551	725,650	11,318 ¹⁰	804,291 ¹⁰	939,380 ¹⁰
San Juan, PR:						
Mexico	17	2,487	2,675	15	2,166	2,419
Portugal	(5)	30	42	1	128	188

See footnotes at end of table.

TABLE 18—Continued
 U.S. IMPORTS FOR CONSUMPTION OF HYDRAULIC CEMENT AND CLINKER, BY CUSTOMS DISTRICT AND COUNTRY¹

(Thousand metric tons and thousand dollars)

Customs district and country	2014			2015		
	Quantity	Value		Quantity	Value	
		Customs ²	C.i.f. ³		Customs ²	C.i.f. ³
San Juan, PR:—Continued						
Spain	71	5,457	6,862	102	7,378	9,193
Other	(5)	105	126	(5)	40	53
Total ⁴	89	8,080	9,705	117	9,712	11,852
Grand total ^{4,6}	8,392	624,631	735,355	11,435 ¹⁰	814,003 ¹⁰	951,124 ¹⁰

¹Revised. -- Zero.

¹Includes all varieties of hydraulic cement and clicker. Data are unrounded but are thought to be accurate to no more than three significant digits.

²Customs value. The price actually paid or payable for merchandise when sold for exportation to the United States, excluding U.S. import duties, freight, insurance, and other charges incurred in bringing the merchandise to the United States.

³Cost, insurance, and freight. The value represents the customs value plus insurance, freight, and other delivery charges to the first port of entry, but excludes costs of offloading, other U.S. port handling charges, and demurrage.

⁴Data may not add to totals shown because of independent rounding.

⁵Less than ½ unit.

⁶Data are underreported with respect to clinker from Canada and cement from Mexico owing to additional material coming in as “informal entries.”

⁷Malta and Gozo have no cement plants; material is believed to be from Turkey.

⁸Material is believed to be from Bulgaria.

⁹Material is believed to be mostly ground granulated blast furnace slag misreported by the importer as clinker.

¹⁰Adjusted by the U.S. Geological Survey to add in 155,398 metric tons of cement, having a customs value of \$10,182,700 and a c.i.f. value of \$10,715,245, that was misreported by the importer under the tariff code for another commodity.

Source: U.S. Census Bureau.

TABLE 19
U.S. IMPORTS FOR CONSUMPTION OF GRAY PORTLAND CEMENT, BY COUNTRY¹

(Thousand metric tons and thousand dollars)

Country	2014			2015		
	Quantity	Value		Quantity	Value	
		Customs ²	C.i.f. ³		Customs ²	C.i.f. ³
Canada	2,727 ^r	210,535 ^r	217,728 ^r	3,343	262,365	269,575
China	803	39,837	57,599	1,575 ⁴	80,678 ⁴	111,181 ⁴
Colombia	36	1,532	1,663	16	558	653
Greece	773	38,152	49,265	1,496	78,145	96,846
Korea, Republic of	1,370	62,264	93,934	1,103	50,095	73,640
Malta and Gozo ⁵	15	790	1,298	--	--	--
Mexico ⁶	27	2,589	2,881	10	1,127	1,287
Norway	--	--	--	25	1,331	1,771
Spain	(7)	--	--	178	9,241	12,020
Sweden	355	17,687	25,675	466	24,262	35,032
Taiwan	356	18,383	25,547	424	22,560	30,249
Turkey ⁵	--	--	--	301	16,777	23,806
Vietnam	18	1,008	1,256	--	--	--
Other	(7)	79 ^r	88 ^r	(7)	78	94
Total ^{6, 8, 9}	6,481 ^r	392,871 ^r	476,960 ^r	8,939 ⁴	547,216 ⁴	656,155 ⁴
Puerto Rico:						
Guatemala	(7)	7	9	--	--	--
Spain	71	5,457	6,862	102	7,378	9,193
Total ^{8, 9}	71	5,464	6,871	102	7,378	9,193
Grand total ^{6, 8, 9}	6,552 ^r	398,335 ^r	483,831 ^r	9,041 ⁴	554,594 ⁴	665,348 ⁴

^rRevised. -- Zero.

¹Data are unrounded but are thought to be accurate to no more than three significant digits.

²Customs value. The price actually paid or payable for merchandise when sold for exportation to the United States, excluding U.S. import duties, freight, insurance, and other charges incurred in bringing the merchandise to the United States.

³Cost, insurance, and freight. The value represents the customs value plus insurance, freight, and other delivery charges to the first port of entry, but excludes costs of offloading, other U.S. port handling charges, and demurrage.

⁴Adjusted by the U.S. Geological Survey to add in 155,398 metric tons of cement, having a customs value of \$10,182,700 and a c.i.f. value of \$10,715,245, that was misreported by the importer under the tariff code for another commodity.

⁵Malta and Gozo have no cement plants; material is believed to be from Turkey.

⁶Data are underreported with respect to imports into the El Paso, TX, customs district owing to additional material coming in as "informal entries."

⁷Less than ½ unit.

⁸Total imports do not include gray portland cement that was misregistered by importers under the white cement tariff code; these quantities are included in table 20.

⁹Data may not add to totals shown because of independent rounding.

Source: U.S. Census Bureau.

TABLE 20
U.S. IMPORTS FOR CONSUMPTION OF WHITE CEMENT, BY COUNTRY¹

(Thousand metric tons and thousand dollars)

Country	2014			2015		
	Quantity	Value		Quantity	Value	
		Customs ²	C.i.f. ^{3,4}		Customs ²	C.i.f. ^{3,4}
Canada	325	42,351	43,502	346	45,792	46,880
China	41	4,531	6,458	35	3,613	4,813
Denmark	100 ^r	10,435	13,061 ^r	159	17,536	20,960
Egypt	95	10,323	14,288	94	10,221	14,135
Malta and Gozo ⁵	--	--	--	25	1,200	1,788
Mexico	253	32,153	35,124	238	28,856	30,356
Portugal	--	--	--	20	2,338	2,363
Spain	(6)	8	9	72	7,484	9,459
Sweden	--	--	--	31	1,953	2,935
Thailand	14	1,820	2,800	11	1,435	2,280
Turkey ⁵	79	7,239	11,759	89	10,130	14,226
Other	(6)	57 ^r	75 ^r	(6)	19	26
Total ⁷	909 ^r	108,917	127,075 ^r	1,120	130,577	150,222
Puerto Rico:						
Algeria	(6)	5	7	--	--	--
Mexico	17	2,487	2,675	15	2,166	2,419
Portugal	(6)	30	42	1	128	188
Total ⁷	17	2,522	2,724	15	2,294	2,607
Grand total ⁷	926 ^r	111,439	129,799 ^r	1,136	132,871	152,829

^rRevised. -- Zero.

¹Data are unrounded but are thought to be accurate to no more than three significant digits.

²Customs value. The price actually paid or payable for merchandise when sold for exportation to the United States, excluding U.S. import duties, freight, insurance, and other charges incurred in bringing the merchandise to the United States.

³Cost, insurance, and freight. The value represents the customs value plus insurance, freight, and other delivery charges to the first port of entry, but excludes costs of offloading, other U.S. port handling charges, and demurrage.

⁴Values of less than \$100.00 (c.i.f.) per metric ton likely indicate the mistaken total or partial inclusion of data for gray portland or similar cement or clinker. This error happens when the importer records the wrong tariff number with the U.S. Customs Service. Values that exceed \$200 per ton likely indicate misidentified specialty cement, not white cement.

⁵Malta and Gozo have no cement plants; material is thought to be from Turkey.

⁶Less than ½ unit.

⁷Data may not add to totals shown because of independent rounding.

Source: U.S. Census Bureau.

TABLE 21
U.S. IMPORTS FOR CONSUMPTION OF CLINKER, BY COUNTRY¹

(Thousand metric tons and thousand dollars)

Country	2014			2015		
	Quantity	Value		Quantity	Value	
		Customs ²	C.i.f. ³		Customs ²	C.i.f. ³
Canada ⁴	614	29,313	29,626	712	32,605	32,908
China	7	1,267	1,421	5	810	851
Croatia	(5)	98	138	1	117	157
France	94	33,709	36,008	--	--	--
Germany	--	--	--	1	13	14
Greece	--	--	--	100	5,728	5,728
Italy	--	--	--	64 ⁶	1,266 ⁶	1,271 ⁶
Korea, Republic of	5	165	341	--	--	--
Spain	--	--	--	19	1,217	1,228
Turkey	--	--	--	40	1,578	2,125
Other	-- ^r	-- ^r	-- ^r	1	86	93
Total ^{4,7}	720	64,552	67,534	942	43,420	44,375

^rRevised. -- Zero.

¹For all types of hydraulic cement. Data are unrounded but are thought to be accurate to no more than three significant digits. Excludes Puerto Rico, which had no imports of clinker for the years shown.

²Customs value. The price actually paid or payable for merchandise when sold for exportation to the United States, excluding U.S. import duties, freight, insurance, and other charges incurred in bringing the merchandise to the United States.

³Cost, insurance, and freight. The value represents the customs value plus insurance, freight, and other delivery charges to the first port of entry, but excludes costs of offloading, other U.S. port handling charges, and demurrage.

⁴Data are underreported with respect to additional material coming in as "informal entries."

⁵Less than ½ unit.

⁶Material is thought to be mostly ground granulated blast furnace slag misreported by the importer as clinker.

⁷Data may not add to totals shown because of independent rounding.

Source: U.S. Census Bureau.

TABLE 22
HYDRAULIC CEMENT: WORLD PRODUCTION, BY COUNTRY^{1,2}

(Thousand metric tons)

Country	2011	2012	2013	2014	2015
Afghanistan	38	37	52	87 ^r	70 ^e
Albania ^c	1,800	2,230 ^r	2,300	2,200	2,200
Algeria ^c	19,000	19,000	18,500	21,000	23,000
Angola ^c	2,000 ^r	3,000 ^r	4,000 ^r	5,100 ^r	5,200
Argentina	11,592	10,716	11,892	11,408	11,000 ^e
Armenia	422	438	431	422 ^r	417
Australia ^c	8,600	8,500	8,400	9,000	9,000
Austria	4,427	4,455	4,385	4,400 ^e	4,810
Azerbaijan	1,425	1,966	2,296	2,941 ^r	2,683
Bahrain ^c	1,300	1,350	1,350	1,300 ^r	1,300
Bangladesh ³	14,690	15,250	16,780	17,000 ^e	18,000 ^e
Barbados	223	176	160	160 ^e	160 ^e
Belarus	4,604	4,906	5,057	5,617 ^r	4,638
Belgium	6,954	6,280	6,119	6,364 ^r	6,300 ^e
Benin	1,460	1,390	1,422	1,396	1,800 ^e
Bhutan	544	521	570	690	791
Bolivia	2,658	2,714	3,061 ^r	3,337 ^r	3,500 ^e
Bosnia and Herzegovina	893	846	882	840	808
Botswana ^c	15 ^r	15 ^r	15 ^r	15 ^r	15
Brazil	64,093	69,323	69,975	71,254	65,283
Brunei	290 ^e	330	340	240 ^r	230
Bulgaria	1,882 ^r	1,803 ^r	1,815 ^r	1,793 ^r	2,114
Burkina Faso	590 ^e	659	580	403	263
Burma ⁴	538	922	1,121	1,317	773
Burundi ^c	35 ⁵	71 ⁵	100	70	100
Cambodia	907	980	1,060	1,400 ^e	1,500 ^e
Cameroon	1,146	1,275	1,400 ^e	1,300	1,600 ^e
Canada	12,001	12,465	11,611	11,879	12,167
Chad ^c	2 ^r	140	180 ⁵	200	200
Chile	4,406	4,722	4,880	5,000 ^e	4,800 ^e
China	2,099,000	2,210,000	2,411,000	2,492,000	2,359,000
Colombia	10,779	10,925	11,252	12,384	13,153
Congo (Brazzaville) ^c	70	150 ⁵	250 ⁵	460	700
Congo (Kinshasa)	458	413	447	330	399
Costa Rica ^c	1,400	1,400	1,460 ⁵	1,500	1,600
Côte d'Ivoire ^c	1,800	1,900	2,300	2,690 ^{r,5}	3,100 ⁵
Croatia	2,682 ^r	2,254 ^r	2,436 ^r	2,471 ^r	2,458
Cuba	1,736	1,825	1,659	1,580	1,518
Cyprus	1,207	1,026	855	735	788
Czech Republic	3,831 ^r	3,434	3,211	3,511 ^r	3,781
Denmark	1,811	1,798	1,830	1,876	1,900 ^e
Djibouti ^c	--	--	150	170 ^r	180
Dominican Republic	3,997	4,130	4,246	5,018 ^r	5,000
Ecuador	5,706	6,025	6,670	6,600 ^e	6,200 ^e
Egypt	43,884 ^r	55,200	50,000 ^e	52,080 ^r	53,940
El Salvador ^c	1,320 ⁵	1,380 ⁵	1,200	1,000	1,000
Eritrea ^c	160 ^r	230 ^r	230 ^r	290 ^r	300
Estonia	451	482	457	447	390
Ethiopia ⁶	2,082	3,548 ^r	4,493 ^r	5,424 ^r	7,500 ^e
Fiji	170	150	181	188 ^r	204
Finland ^c	1,387 ⁵	1,293 ⁵	1,300	1,250	1,300
France	19,270	17,810	18,018	16,400 ^r	15,600
French Guiana ^c	90	100	94 ^r	87 ^{r,5}	83 ⁵
Gabon ^c	226 ⁵	200	170	170	150
Georgia	1,502	1,546	1,619	1,626	1,755
Germany	32,779 ^r	32,432	31,308	32,099	31,160
Ghana ^c	2,500	4,600 ^{r,5}	4,500 ^r	4,500 ^r	3,830
Greece	5,553	5,005	5,990	5,128	5,500 ^e
Guadeloupe ^{e,7}	300	300	300	300	300

See footnotes at end of table.

TABLE 22—Continued
HYDRAULIC CEMENT: WORLD PRODUCTION, BY COUNTRY^{1,2}

(Thousand metric tons)

Country	2011	2012	2013	2014	2015
Guatemala	2,850	2,880	2,970	3,500 ^c	3,500 ^c
Guinea	365	317	377	435 ^r	500 ^c
Guyana	--	--	--	2	100 ^c
Haiti ^c	50 ^r	75 ^r	100 ^r	200 ^r	200
Honduras ^c	1,620 ^s	1,730 ^s	1,700	1,700	1,700
Hong Kong	1,537	1,675	1,768	1,900 ^c	1,900 ^c
Hungary	1,694	1,870	2,022	2,100 ^c	2,000 ^c
Iceland	142 ^r	146 ^r	--	--	--
India ^c	240,000	270,000	280,000	280,000 ^r	300,000
Indonesia	45,238	52,350	56,690	56,760 ^r	59,850
Iran	66,000 ^c	70,250	68,700	66,700 ^r	58,600
Iraq ^c	10,000	10,000	12,000	9,000 ^r	10,000
Ireland ^c	2,103 ^s	1,198 ^s	2,000	2,000	2,500
Israel	5,480	5,892	6,398	6,603	6,904
Italy	33,120	26,240	23,100	21,400	22,000 ^c
Jamaica	766	760	825	830	808
Japan	51,291	54,737	57,962	57,913	54,827
Jordan	2,816	4,060	4,200	4,400 ^{r,c}	4,500 ^c
Kazakhstan	7,642	7,050	7,072	8,140 ^r	8,729
Kenya	4,478	4,694 ^r	5,059	5,883	6,353
Korea, North	6,452 ^r	6,446 ^r	6,600 ^r	6,675 ^r	6,697
Korea, Republic of	48,249	46,862	47,291	47,048	52,044
Kosovo ^c	420	535	560	630	590
Kuwait ^c	2,250	2,400	3,000	3,800	4,200
Kyrgyzstan	1,022	1,239	1,676 ^r	1,730 ^r	1,496
Laos ^c	1,300	1,500	1,500	1,900 ^r	2,000
Latvia ^c	752 ^s	901 ^s	1,000	1,100 ^r	1,100
Lebanon	5,550	5,309	5,831	5,517	5,130
Liberia	81	122	194	295	298
Libya ^c	3,500	2,000	2,000	3,300 ^r	2,700
Lithuania	996	1,015	1,070	903	980
Luxembourg	1,229 ^r	1,177	980	1,100 ^c	1,000 ^c
Macau	450	440	580	590 ^c	600 ^c
Macedonia	930 ^r	645 ^r	730 ^r	660 ^r	672
Madagascar ^c	200	230	230	240	240
Malawi ^c	250 ^r	240 ^r	230 ^r	270 ^r	280
Malaysia	21,198	21,726	21,457	21,700 ^r	22,000 ^c
Mali	--	--	440	660	630
Martinique ^c	150	150	150	150	150
Mauritania	565	630 ^r	690	870 ^r	860
Mexico	35,400	36,184	34,612	36,597 ^r	39,613
Moldova ^c	1,000	1,200	1,150	1,300	1,200
Mongolia	426	349	259	411	410
Morocco	14,000 ^c	16,270	16,870	15,710	16,000 ^c
Mozambique ⁸	976	1,184	1,299	1,512 ^r	1,585
Namibia	390	501	662	731	796
Nepal ^c	2,100	2,720 ^s	2,990 ^s	3,100	2,000
Netherlands ^c	2,318 ^s	2,056 ^s	2,000	2,000	2,200
New Caledonia ^{c,9}	146	125	119	106	112
New Zealand ^c	1,200	1,140 ^s	1,200 ^r	1,100	1,200
Nicaragua ^c	700	620	650	700	700
Niger	66 ^r	75 ^r	29	21	51
Nigeria ^c	12,000	16,000	20,000	20,000	21,000
Norway ^c	1,387 ^s	1,659 ^s	1,700	1,700	1,800
Oman ^c	5,000	6,100 ^r	5,800 ^{r,s}	5,100 ^{r,s}	5,300
Pakistan	29,163 ^r	30,183 ^r	31,460 ^r	31,960 ^r	33,290
Panama	1,766	2,310	2,366	2,188	2,200
Papua New Guinea ^c	200	200	200	200	200
Paraguay ^c	650	800	960	1,000	1,200

See footnotes at end of table.

TABLE 22—Continued
HYDRAULIC CEMENT: WORLD PRODUCTION, BY COUNTRY^{1,2}

(Thousand metric tons)

Country	2011	2012	2013	2014	2015
Peru	8,500 ^e	9,847 ^r	10,527	10,676	10,410
Philippines	16,063	18,907	20,150	21,305 ^r	24,050
Poland	18,552	15,468 ^r	14,538	15,358	15,750
Portugal ^e	5,069 ⁵	4,090 ⁵	5,000	6,000 ^r	6,500
Qatar ^e	5,000	5,500	5,335 ⁵	6,500 ^r	6,500
Reunion ^e	250	350	400	400	350
Romania	8,087 ^r	8,223	7,451	7,621	8,356
Russia	56,200	61,700	66,503	69,139 ^r	62,104
Rwanda ^e	94 ⁵	106 ⁵	130 ^r	140	200
Saudi Arabia	48,450	53,332	56,238	57,223	61,900
Senegal	4,677	4,689	5,191	4,899	4,615
Serbia	2,095	1,831	1,592	1,605	1,654
Sierra Leone	311	335	313	336	324
Slovakia	3,219	2,915	3,121	3,319	3,466
Slovenia	760 ^r	745 ^r	614 ^r	706 ^r	600 ^e
South Africa, finished products, sales	11,234	11,560	12,168 ^r	12,068 ^r	13,000 ^e
Spain	22,178	15,939	13,736	14,587	15,000 ^e
Sri Lanka	1,984	2,066 ^r	1,929	1,885	2,287
Sudan	3,002	3,511	3,538	3,478	3,708
Suriname	74	114	131	130 ^e	160 ^e
Sweden	2,064	2,141	2,560	2,500 ^e	2,800
Switzerland	4,750 ^r	4,467 ^r	4,640 ^r	4,280 ^r	4,330 ^e
Syria ^e	5,000	6,000	4,000	3,800 ⁵	4,000
Taiwan	16,852	15,808	16,554	14,592	13,445
Tajikistan	299	232 ^r	384	1,150	1,410
Tanzania	2,409	2,581	2,346	2,809	3,135
Thailand	30,290	31,760	35,854	34,980	36,216
Togo ^{e, 10}	1,200 ^r	1,600 ^r	1,800 ^r	1,700 ^r	1,500
Trinidad and Tobago	827	654	802	837	840
Tunisia	7,055	7,241	7,504	9,127	9,516
Turkey	63,405	63,879	71,337	71,329	71,419
Turkmenistan	1,950	2,370	2,650	2,900 ^e	3,300 ^e
Uganda	1,666	1,780	2,023	2,141	2,330
Ukraine	10,515	9,843	9,857	8,636 ^r	8,511
United Arab Emirates ^e	16,000 ^r	15,000 ^r	16,000 ^r	20,000 ^r	20,000
United Kingdom	8,529	7,952	8,203	8,958	9,600
United States, including Puerto Rico ¹¹	68,639	74,934	77,415	83,124 ^r	84,940
Uruguay	968	872	850 ^e	820	730
Uzbekistan	6,698	6,800	6,990	7,350	8,250
Venezuela	7,760	8,440 ^r	8,846 ^r	7,940 ^r	8,210
Vietnam	58,271	56,353 ^r	57,516	60,982 ^r	67,427
Yemen ^e	2,800 ^r	2,760 ⁵	3,300 ⁵	3,100 ^r	3,100
Zambia ^e	1,200 ^r	1,600 ^r	1,810 ⁵	2,200	2,100
Zimbabwe ^e	1,000	1,480 ⁵	1,200 ^r	1,300	1,300
Total ^e	3,630,000	3,820,000	4,070,000	4,190,000 ^r	4,100,000

^eEstimated. ^rRevised. -- Zero.

¹World totals and estimated data are rounded to no more than three significant digits; may not add to totals shown. Even where presented unrounded, reported data are thought to be accurate to no more than three significant digits. Data are from a variety of sources, including the European Cement Association.

²Includes data available through February 8, 2018. May include clinker exports for some countries.

³Data are for fiscal year starting July 1 of year shown.

⁴Data are for fiscal year starting April 1 of year shown.

⁵Reported figure.

⁶Data are for fiscal year ending July 7 of year shown.

⁷Breakout, based on capacities, between Guadeloupe and Martinique.

⁸Cement sales from Cimentos de Moçambique SARL (Sociedade Anónima de Responsabilidade Limitada) only.

⁹Data for New Caledonia are for sales of domestically produced cement as a proxy for production.

¹⁰Calculated based on reported production of clinker and imports and exports of cement and clinker.

¹¹Portland and masonry cements only. Includes a small (less than 0.3% per year) component of double-counting where portland cement (not clinker) is consumed to make masonry cement; the precise amount of double-counting cannot be determined because of the involvement of portland cement stockpiles.